POST-CONVENTION ISSUE June, 1946

THE FOUNDRY

wherever metals are cast...

You saw OSBORN at the Show!

The most complete line— and one that is *constantly improving.*

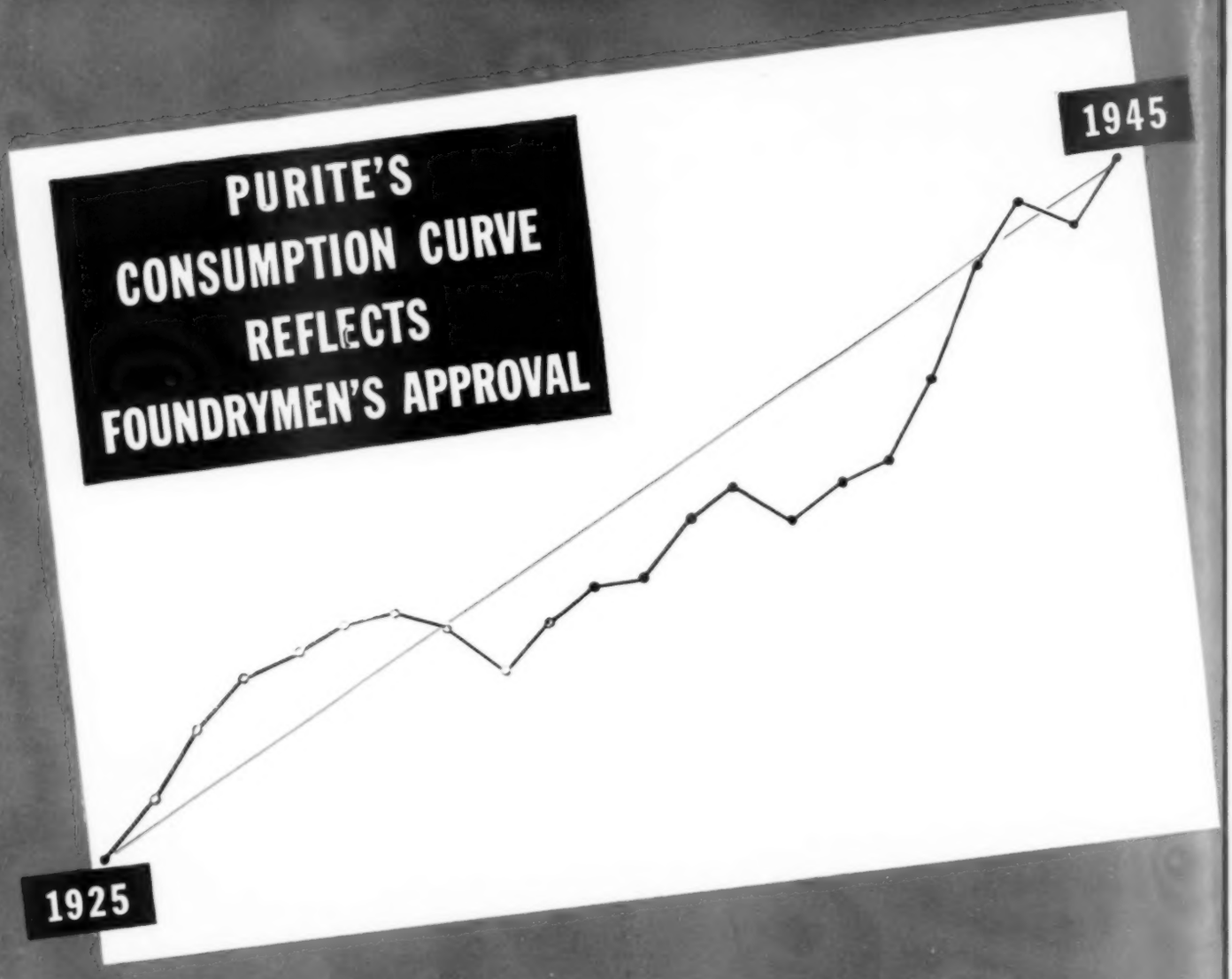
MEMBER MANUFACTURER'S ASSOCIATION, INC. FOUNDRY EQUIPMENT

OSBORN

MOULDING MACHINES CORE BLOWERS

OSBORN MANUFACTURING COMPANY 5401 Hamilton Avenue Cleveland, Ohio

PURITE'S CONSUMPTION CURVE REFLECTS FOUNDRYMEN'S APPROVAL



The steady climb of this consumption curve *proves* the value of Purite in refining cupola cast iron. The increasing demand for this scientific flux over a 20-year span is the best testimonial foundrymen can give to Purite.

Purite's remarkable action in desulphurizing and refining iron in the ladle or in the cupola hearth—its effect on combustion—and its action in smoothing out cupola melting operations are the reasons behind the ever-increasing use of Purite by progressive foundrymen everywhere.

Purite does *more* than remove sulphur; it purges molten metal of occluded gases, entrained oxide-silicates and other non-metallic impurities that may cause pinholes, gas pockets and segregated defects. Refining with Purite increases the strength . . . improves grain structure and machinability . . . speeds production of cleaner, sounder castings.

According to a recent survey, over 70% of the foundries in four principal casting centers in the North, South, East and Midwest are using Purite regularly. We feel you'll want to know why so many foundries consistently order Purite—so write for free factual information that tells how Purite helps them, and how it can help you in these competitive days.

Mathieson
CHEMICALS

THE MATHIESON ALKALI WORKS (INC.)
60 EAST 42nd STREET, NEW YORK 17, N. Y.
In Canada: Railway & Power Engineering Corporation, Limited.

Purite (Fused Soda Ash) . Liquid Chlorine . Caustic Soda . Soda Ash . Bicarbonate of Soda . Ammonia, Anhydrous & Aqua . Sodium Chlorite Products . Chlorine Dioxide HTH Products . Synthetic Salt Cake . Dry Ice . Carbonic Gas . Sodium Methylate

99% PURE FUSED SODA ASH

PURITE

The Scientific Flux for Better Melting and Cleaner Iron

Mighty Good Service

...for a mighty long time

PUBLIC LIBRARY
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DETROIT

Chances are, you take your wire rope pretty much for granted.

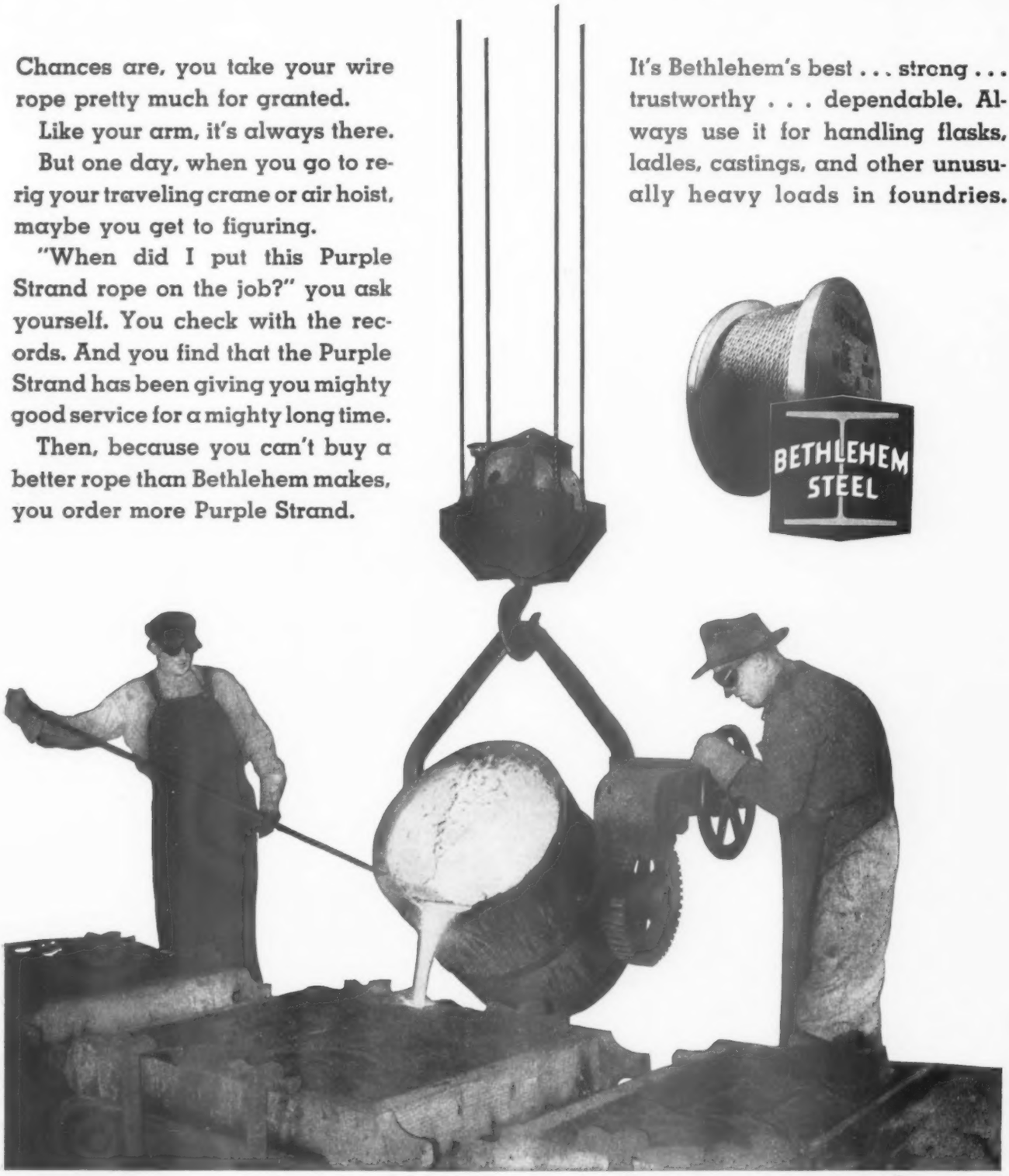
Like your arm, it's always there.

But one day, when you go to re-rig your traveling crane or air hoist, maybe you get to figuring.

"When did I put this Purple Strand rope on the job?" you ask yourself. You check with the records. And you find that the Purple Strand has been giving you mighty good service for a mighty long time.

Then, because you can't buy a better rope than Bethlehem makes, you order more Purple Strand.

It's Bethlehem's best . . . strong . . . trustworthy . . . dependable. Always use it for handling flasks, ladles, castings, and other unusually heavy loads in foundries.



When you think WIRE ROPE . . . think BETHLEHEM

GREEN BOND

A handful of Federal Green Bond is as uniform as a carload. Its use gives foundries a constant never-changing mix for sand of any desired strength. Green Bond is stable and dependable—does *not* require constant supervision in the sand system. Federal Green Bond is still—

The Best of the Bentonites

THE FEDERAL FOUNDRY SUPPLY COMPAN

4600 East 71st Street • Cleveland 5, Ohio

Seacoal Plant
CROWN HILL, W. VA. • CHICAGO • CHATTANOOGA, TENN. • DETROIT • MILWAUKEE • NEW YORK • ST. LOUIS • RICHMOND, VA. • Mines UPTON, WY

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Pacific Graphite Works, Oakland, Calif. • LaGrand Industrial Supply Co., Portland, Ore.
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THE FOUNDRY

for JUNE 1946

VOLUME 74 NUMBER 6

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THE FOUNDRY is published monthly by THE PENTON PUBLISHING CO., Penton Building, 1213 West Third Street, Cleveland, O. EARL L. SHANER, President and Treasurer; GEORGE O. HAYS, Vice President and General Manager; RUSSELL C. JAENKE, Vice President; FRANK G. STEINEBACH, Vice President and Secretary, and EDITH L. WERNER, Assistant Treasurer.

Subscription: In the United States and possessions, Canada, Mexico, Cuba, Central and South America, one year $3; two years, $5. Other foreign countries, $5. Single copies 35 cents. Copies published three months or more previous to date of current issue, 50 cents.

Member: Audit Bureau of Circulations, Associated Business Papers, National Publishers Association.

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Entered as second class matter at postoffice at Cleveland under the act of March 3, 1879.

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LINOIL IN

Not without honor in its own home town

★

Eighteen thousand foundrymen carry from Cleveland pleasant recollections of the Golden Jubilee Convention—and Cleveland says heartily "Come back again." Foundrymen who visited Cleveland foundries saw Linoil in action, and those who stayed close to the big top saw in our booth specimen cores from the 57 local foundries who use Linoil. Good foundrymen use Linoil.

Visitors at The West Steel Casting Co. will recognize the huge barrel cores shown here. These cores are made with Linoil and Wests' have an enviable record of infinitesimal casting losses, practically none due to cores. The castings are for the double-tired truck wheels. Finley Davison who stands by the core has been making these and other cores at The West Steel Casting Company for 31 years. The man who moved, in the other picture, is Steve Rosandich, 15 years at Wests. Not such a good portrait of Steve, but a good picture of a heap of single wheel castings behind him. All castings shown are made with Linoil cores. Some foundries use Linoil for economy—it makes simple cores cheaply; others use Linoil for its super-efficiency in making the most intricate cores.

THE WERNER G.

(DIVISION OF ARCHER-

2191 WEST 110 STREET WOODBINE

CLEVELAND

57 FOUNDRIES USE IT!

How does it come so many Cleveland foundries use Linoil? Here is how it works. Twenty-one years ago this month The West Steel Casting Company consented to take in one drum of Linoil on approval. They found it the best core oil they had ever used and they continued to buy Linoil—twenty-one years. It is much the same story in each of the other 57 and in fact in the thousand and more other foundries that use Linoil, first a trial drum, then continuous steady use—some more than 21 years, others less.

LINOIL

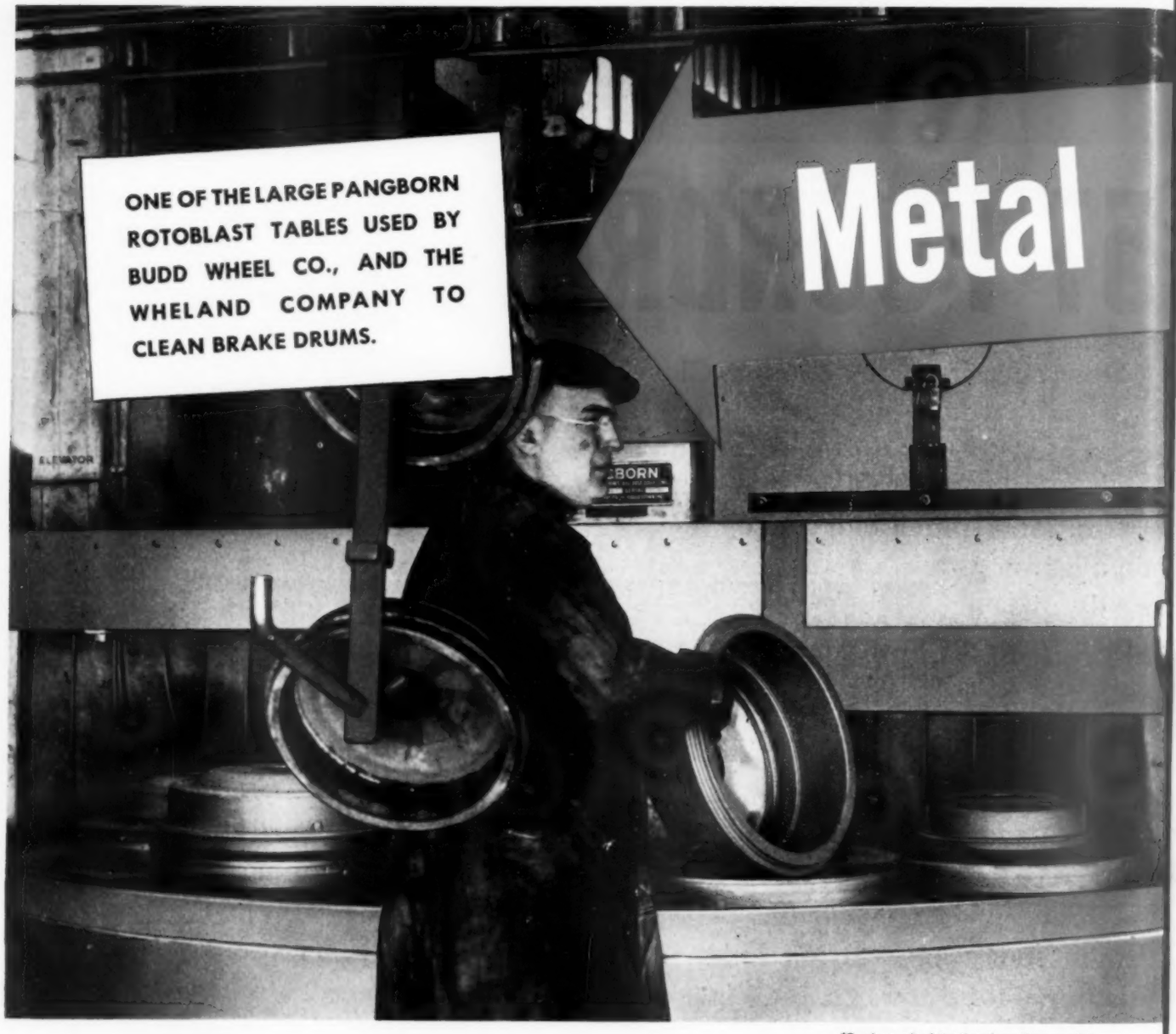
USE THE LOGICAL OIL FOR CORES

Order your trial drum of Linoil today and start a long history of the use of Linoil in your foundry. For high binding strength, economy of oven time and fuel, small production of gas in the molds, easy clean out, and absolute uniformity from month to month and year to year, Linoil is the oil you should have for your cores.

SMITH COMPANY

DANIELS - MIDLAND COMPANY)

4690 CLEVELAND 2, OHIO



*Trade-mark of the Pangborn Corporation

Rotoblast*

CLEANS METAL AT LESS COST

900 to 1000 passenger-car brake drums per hour, a proportionate number of truck brake drums per hour—that's the rate at which *The Wheland Company, Chattanooga, Tenn.*, will blast clean using Pangborn Twin ROTOBLAST* Auxiliary Spindle Tables.

Budd Wheel Co., which has used Pangborn ROTOBLAST Tables for a number of years to clean brake drums, recently ordered additional ROTOBLAST Tables and when they are installed will have a total of ten tables.

Cleans Metal Faster

The two cases described on the opposite page are typical of the world-famous companies using the ROTOBLAST method of airless blast cleaning, which saves time, saves breakage, improves quality and uniformity, facilitates inspection and machining.

ROTOBLAST Tables—with 45° Wheel —Shorten Time Further

More thorough, more uniform cleaning on table-type machines, such as Budd Wheel Co. and The Wheland Company use, results from the exclusive Pangborn design which directs the blast stream on the work at a 45° angle. Vertical as well as horizontal surfaces get cleaned at the same time—making it often unnecessary to turn the work for second and third passes.

Other features of ROTOBLAST Tables include variable table speed, large work openings, rim drive, non-clogging sweeps.

Complete information on ROTOBLAST equipment is available by addressing Pangborn Corporation, Hagerstown, Maryland, *world's largest manufacturer of blast cleaning and dust control equipment.*

Pangborn

PANGBORN CORPORATION, HAGERSTOWN, MARYLAND

ROTOBLAST

The airless centrifugal unit that propels metal abrasive without crushing, without waste.

Latest Information on Economical Blast Cleaning

Pangborn Corporation, 264-A Pangborn Blvd., Hagerstown, Maryland

Gentlemen: Please send me free bulletin checked:

ROTOBLAST Barrels No. 213 ☐. ROTOBLAST Special Machines, No. 2120 ☐. ROTOBLAST Tables, No. 211 ☐. Air Blast Rooms, No. 400 ☐.

Name..... Title.....

Company.....

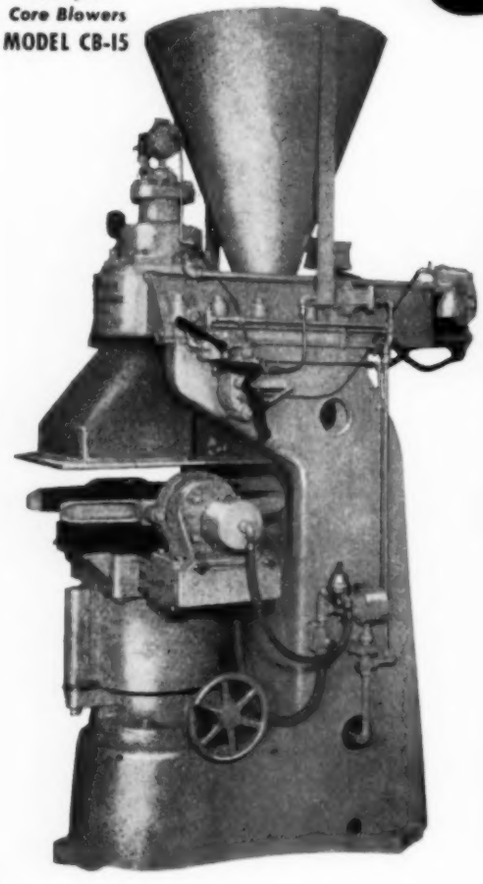
Address.....

FOUNDRYMEN from Coast to Coast

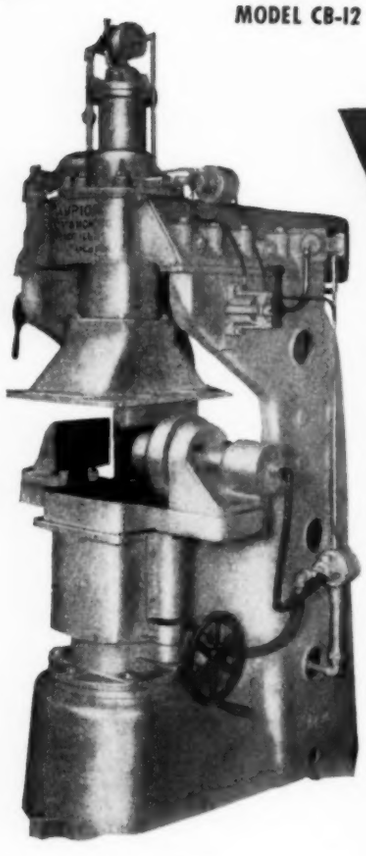
are thrilled by

CHAMPION "Knowhow"

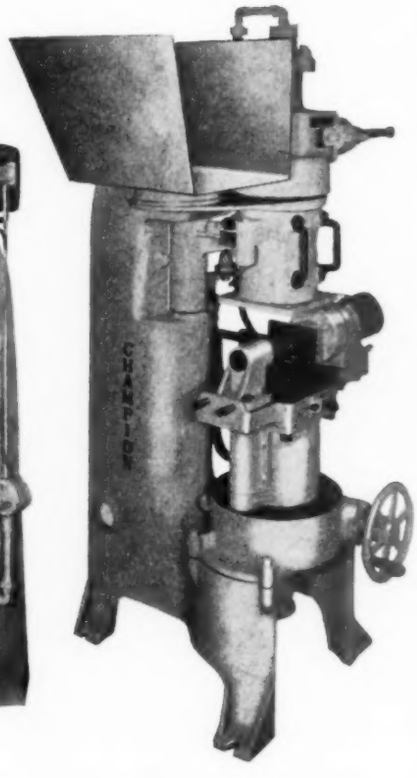
Champion
Core Blowers
MODEL CB-15



Champion
Core Blowers
MODEL CB-12



Champion
Core Blowers
MODEL CB-8

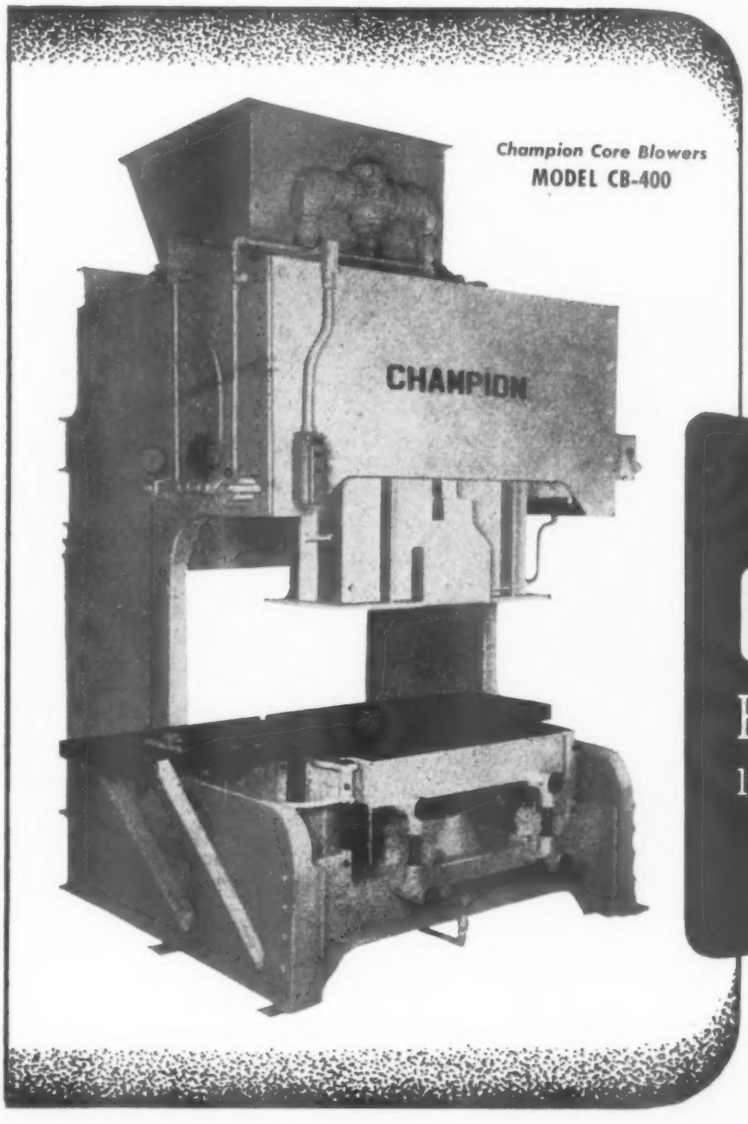


Performance under the stress and strain of today's demand for accelerated production of perfectly rammed cores is the test of a true Champion—a top-notch tool with the "know how" or "savvy" to remove all guesswork.

That is how a Champion Core Blower performs for the least experienced operator. Any man or woman—boy or girl can produce perfectly rammed cores on a Champion Core Blower by merely setting the box and pulling the lever. In a single second small or large cores are perfectly rammed. The working table is completely accessible with no obstructions, so that cores are produced faster, more economically and more accurately without need for highly trained labor.

A single valve operates the core box clamp, clamps same against the blow plate, blows the core, exhausts and releases the clamps in the proper cycle. Rigid one-piece, cast steel frame insures accurate alignment of core box and blow plate. Patented Air-Operated Hydraulic Clamp locks the core box securely against split box separation.

Champion Core Blowers could be the answer to that most puzzling problem of man-power.



CHAMPION
FOUNDRY & MACHINE CO.
1318 West 21st Street Chicago 8, Illinois

ANNOUNCING THE NEW *Lightweight Tote-All*

. . . for handling foundry sand, annealing coal and for many other conveying jobs in the foundry SAVES TIME, MONEY AND EQUIPMENT

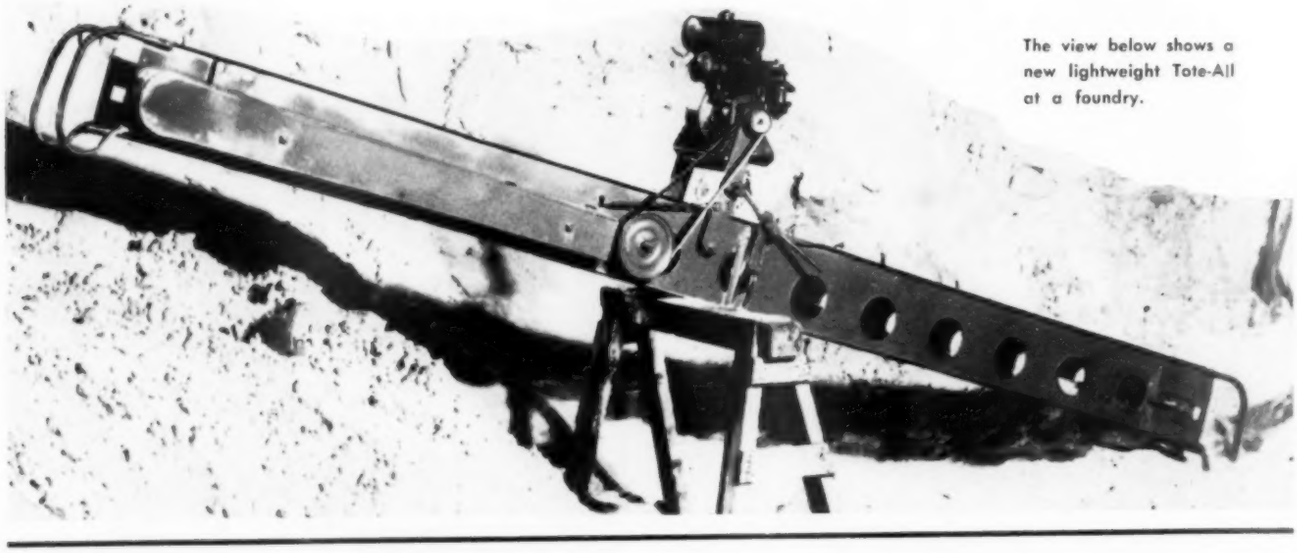
THE NEW LIGHTWEIGHT TOTE-ALL PORTABLE POWER CONVEYOR WEIGHS APPROXIMATELY 135 lbs. WITHOUT MOTOR . . . EASILY MOVED FROM JOB TO JOB BY ONE MAN. A BIG TIME AND MONEY SAVER FOR FOUNDRIES.

Here's the new, speedy, lightweight Tote-All portable power conveyor for foundries. It answers that need for an exceptionally lightweight conveyor for unloading core sand from freight cars into bins or bin conveyors . . . or for handling coal in the foundry. The 12-ft. model weighs approximately 135 lbs. without motor . . . is easily moved by one man from one conveying job to another. The lightweight Tote-All is built of special alloy steel—corrosion resistant and abrasion resistant. Power unit is mounted above conveyor out of the way of dust, dirt and spillage.

QUICK FACTS ON THE NEW LIGHTWEIGHT TOTE-ALL

- 12 ft. and 16 ft. models available; 8 in. belt
- Corrosion and abrasion resistant
- Gasoline or electric power unit optional, mounted ABOVE conveyor.
- Gasoline unit is adjustable to keep engine level at all conveyor positions.

Get full information from your dealer or write direct. Ask for Bulletin F.



The view below shows a new lightweight Tote-All at a foundry.

Tote-All

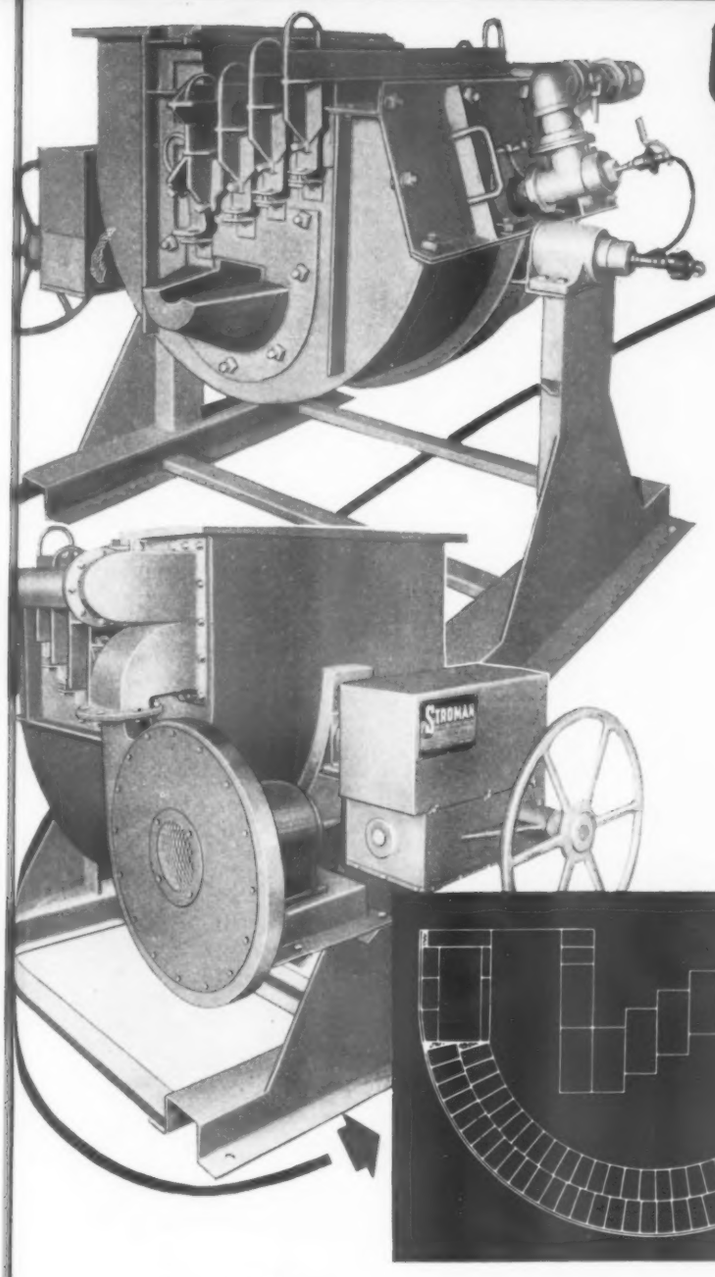
TOTE-ALL DIVISION

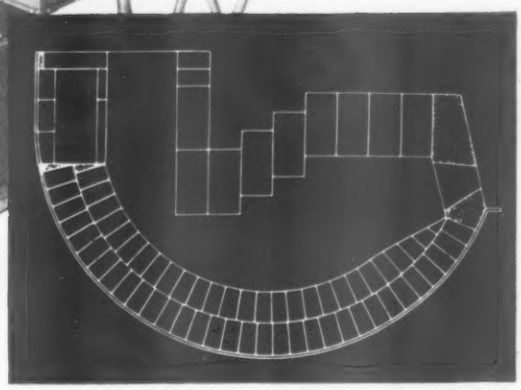
COALTOTER CONVEYOR CO. (Not Inc.)

310 S. Michigan Ave. Chicago 4, Ill.

PORTABLE POWER CONVEYOR

Another STROMAN First!





SKLENAR FURNACES FOR MELTING GREY IRON AND COPPER ALLOYS!

Sklenar Non-Crucible, Direct Fired, Improved Reverberatory Melting Furnaces have been tried and proved highly successful for making Grey Iron Castings, with gas and oil fire. By installing Sklenar Furnaces, grey iron foundries may now be operated in the same manner as brass foundries, by casting successive heats throughout the day. Average melting time is from 40 minutes to one hour per heat. Sklenar Furnaces to handle 500, 750, 1200 and 2000 pounds are now available . . . larger sizes to handle up to 10,00 pounds will be released at a later date.

In these remarkable furnaces metal is charged into a hopper which is also an exhaust from the combustion chamber. Here metal is preheated and melted at the throat of the hopper. Cold metal does not reach the molten bath. Charging is continuous. These furnaces will melt faster and give greatest fuel economy, as combustion chamber is heated by the same fuel used to melt the metal in the throat of the hopper. Available with either mechanical or hand tilt . . . oil or gas fire. . . . and remember Sklenar Furnaces handle non-ferrous metals perfectly too.

STROMAN MANUAL TILT CRUCIBLE FURNACES

For Brass, Bronze and Aluminum

Redesigned and engineered for better and faster melting as well as greater fuel economy. Many leading foundries find them indispensable. They will do your job better and effect many savings. Oil or Gas Fire. Capacities from No. 40 to No. 400 Crucible.

New Stroman Crucible Stationary Melting Furnaces

For Brass, Bronze, Aluminum and other non-ferrous metals

Sturdy, efficient and featuring the Stroman Push-Back Cover, these stationary furnaces are designed for peak production and greatest fuel economy. Oil or Gas Fire. Capacities from No. 20 to No. 400 Crucible.

STROMAN FURNACE & ENGINEERING CO.

DIVISION OF

THE PETERSEN OVEN CO. 300 W. ADAMS ST. CHICAGO 6

Here's Longer Wheel Life

AND NEW GRINDING EFFICIENCY FOR YOU

INGENIOUS NEW DEVELOPMENTS END WHEEL BOUNCING AND PERMIT SMOOTHER, BETTER AND FASTER SNAGGING AND CUTTING

GENERAL GRINDING WHEEL
DIAMOND BRAND
GENERAL GRINDING WHEEL CORPORATION'S UNIQUE MANUFACTURING PROCESS RIGIDLY CONTROLS THE SIZE OF THE ARBOR HOLE

IN SNAGGING and in other grinding operations, wheel bouncing and vibration not only measurably shortens the life of the wheel but also affects the accuracy of the work. When you "wring" or force a grinding wheel on into place you risk damaging the spindle as well as the wheel thereby causing it to run out of true. Then too certain stresses may be set up which cause the wheel to break. A grinding wheel should fit the spindle snugly or else it will bounce and vibrate causing a hammering action on the work. "General's" unique manufacturing process produces superior snagging and grinding wheels with arbor holes that are accurate to close tolerances. This means longer wheel life and smoother performance. Westaluma cut off wheels are fitted with patented aluminum bushings which protect the spindle from being scored. Even when there is slippage your spindle is protected by the soft bushing. There is a "General" wheel for your every requirement and they assure you: cooler grinding action, longer wheel life and faster stock removal.

CONTACT US FOR COMPLETE INFORMATION

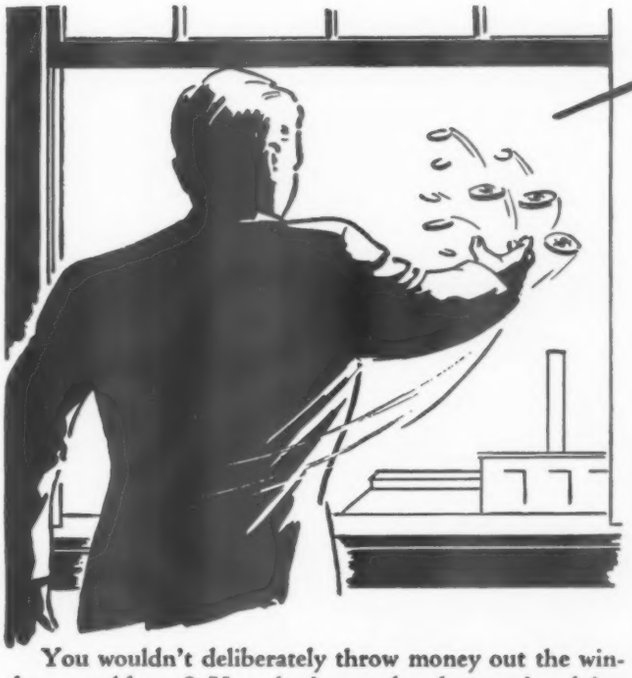
ALUMINOID — CARBONOID

DIAMOND BRAND

WESTALUMA — WESTCARBO

GENERAL GRINDING WHEEL CORPORATION
(West Abrasives, Inc.)
3132 E. THOMPSON STREET
PHILADELPHIA 34, PENNSYLVANIA

Westaluma the only wheel developed especially for the cutting of Gates and Risers



PICTURE OF A FOUNDRY OWNER

WHO STICKS TO *Old-Fashioned* CRUCIBLE FURNACES

The revolutionary Radiant furnace can be fired with gas or oil in tandem. Both stationary and tilting types are available. (Patents Pending.)

You wouldn't deliberately throw money out the window, would you? Yet, that's exactly what you're doing if you hang onto old-style crucible furnaces when you could have the advantages of a Radiant top-fired furnace, at no cost. This new crucible melting furnace will pay for itself the first year! It's revolutionary...and better...because it has *two* crucibles, loaded at all times. They are fired alternately; while the first crucible is heated, the flue gases from it preheat the second crucible. While the metal from the first crucible is being poured, a third crucible replaces the removed crucible to receive cold metal. The covers are cam lifted and swung backward independent of one another, so that each side is fired alternately. With this fuel-saving, faster-heating furnace available, you can't afford to use the older type any longer! Write today for further information.

Scrap your old furnaces at *A Profit*—Here are 18 reasons:

1. 25 to 30% fuel saved on aluminum and magnesium. 40 to 50% fuel saved on brass and copper.
2. 50 to 100% longer pot life.
3. 50 to 100% longer lining life.
4. 50 to 100% longer cover life.
5. 50 to 100% longer burner life.
6. Easy to charge. (No flame through cover)
7. Far lower metal loss. (Flame does not impinge on metal)
8. Faster heating. (Combined radiant and convection heating)
9. Less slagging. (Less slagging and no slag build up possible)
10. Lining is easy to replace. (No burner ports)
11. Burners easy to inspect and replace. (Change in 15 minutes)
12. Burners cannot plug. (Burners in top where slag or metal cannot reach them)
13. Pure metal. (Neutral pressure on metal surface allows charcoal or atmosphere to be used)
14. Furnace can be flued through the floor to the outside, eliminating heat and gases in foundry.
15. No leakage of cover. (No flame through or around cover)
16. Quiet operation.
17. Unobstructed flueing. (Flued at bottom and charge does not affect it)
18. Metal is visible at all times and temperature can be taken at any time, without shutting off burners.

RADIANT COMBUSTION, Inc.

BUILDERS OF EVERY TYPE (OIL, GAS, ELECTRIC) OF HEAT TREATING FURNACE

WARREN . . OHIO

RADIANT COMBUSTION, Inc.
WARREN . . OHIO

Please give us further information

Company_____

Your Name_____

Address_____

City_____ State_____

The 12"-38" Adams Jolt Squeezer, Portable Type

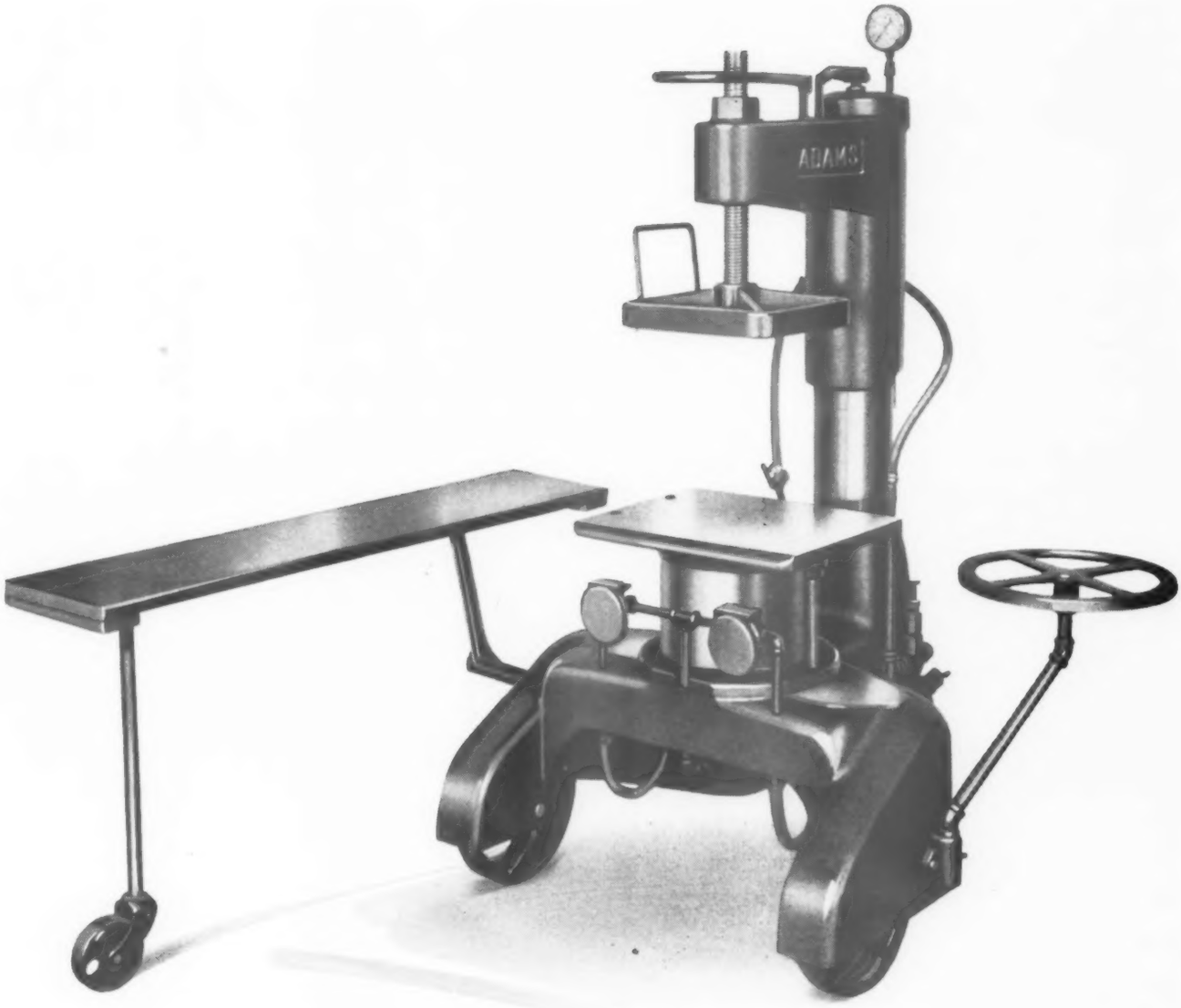
Produce Efficiently-Use A

SIDE ROD TYPE PORTABLE OR STATIONARY	Squeeze Piston diameter	Jolt Piston diameter	Clearance between Side Rods	Pattern Draw, Adjustable
10"-32" Jolt Squeezer	10"	4"	32"	
12"-38" Jolt Squeezer	12"	5"	38"	
16"-42" Jolt Squeezer	16"	6"	42"	
10"-32" Universal Jolt Squeezer	10"	4"	32"	3" to 6"
12"-38" Universal Jolt Squeezer	12"	5"	38"	3" to 6"

Also Adams Hand Squeezers—30", 34" or 38" between side rods—Portable or Stationary.

THE ADAMS COMPA N

MOLDING MACHINES · FLASK



The 10" Post Type Universal Squeezer, Portable Type

Adams Molding Machines

POST TYPE
PORTABLE OR STATIONARY

	Squeeze Piston diameter	Jolt Piston diameter	Pattern Draw, Adjustable
10" Post Type Jolt Squeezer	10"	4"	
12" Post Type Jolt Squeezer	12"	5"	
10" Post Type Universal Jolt Squeezer	10"	4"	3" to 6"
12" Post Type Universal Jolt Squeezer	12"	5"	3" to 6"

Also manufacturers of Snap Flasks, Slip Flasks, Jackets, Bands, Presser Boards, Bottom Plates, Upsets, Match Frames, Tubular Sprue Cutters and Vibrators.

NY · DUBUQUE, IOWA · U.S.A.

EQUIPMENT *Established 1883*

ROYER COMPACT SHAKE-OUT CUTS COSTS

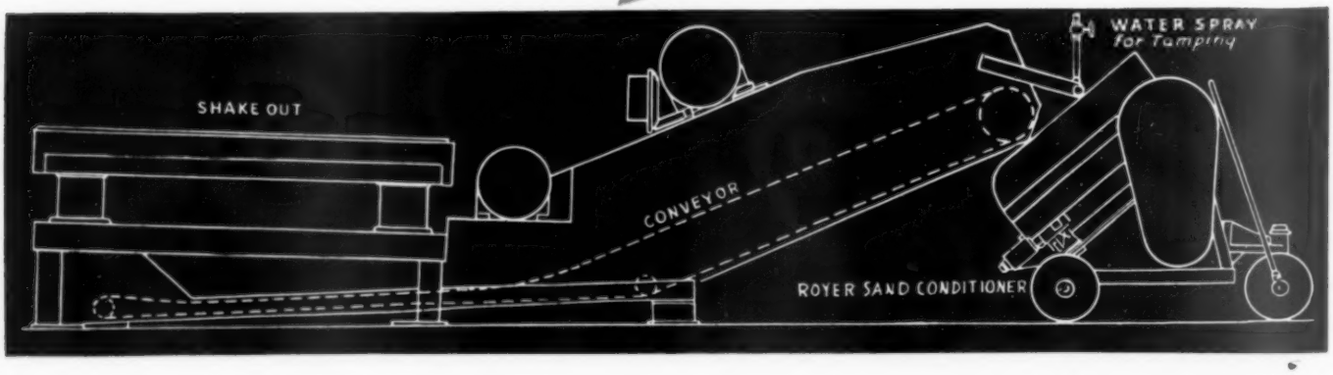
Labor for handling sand is minimized in this Chicago non-ferrous foundry by the Royer installation pictured at the left and detailed in the sketch below. Shake-out and sand conditioning are effectively merged into one continuous operation. *No pit or foundation is required for this unit!*

The sand is released from the flasks by the Royer Walking Beam Shake-Out. The conveyor delivers the sand, cooling it during the movement, to the Royer Model "NC-2" Sand Separator and Blender. Here water is added and the sand is converted to prime condition for re-use by the molders at a rate of up to 15 tons per hour. (Another Royer is shown in the background of the illustration.)

This streamlined Royer unit is efficient in operation and effects important savings because of the high efficiency of its components.

The Royer Shake-Out operates with a fast, positive walking beam action. Flasks, sands, castings, etc. are conveyed off one end without need of an auxiliary feeder. During operation only the walking beam moves; the structure remains stationary, with no destructive vibrations transmitted to the machine. There is identical live action over the entire shake-out area. No dead zones. Royer Shake-Outs do not damage flasks or castings and have years of low maintenance operation to their credit. Units can be made to suit any arrangement.

The Royer Sand Separator and Blender reduces costs in four ways: 1 — saves man-power; 2 — saves on sand by making it usable longer; 3 — reduces casting cleaning time through smoother molds; 4 — lowers discount by eliminating causes of surface defects. It discharges the kind of sand that makes true-to-pattern molds. Over 7,300 of these Royers are in service.



AND SAND CONDITIONING UNIT AT HUNTER FOUNDRY.....

Send for Catalog 744 and ask for information on the Royer Shake-Out.

ROYER

FOREMOST IN SAND CONDITIONING EQUIPMENT

ROYER FOUNDRY & MACHINE CO.
KINGSTON, PENNSYLVANIA

MINCO BOND

GREEN STRENGTH CANNOT GIVE YOU PRODUCTION

Industrial engineers have constructed mechanized foundries here in America, which have astounded the world in the volume of castings produced.

Millions of dollars are invested in some of these giant, mechanized foundries for the sole purpose of mass production of sound castings. In the past period of progress of these PRODUCTION FOUNDRIES, Bentonite has been the standard bonding agent for the molding sand and the scrap loss chart has been the record upon which all study and attention has been focused.

Any casting on a system in a mechanized foundry which shows even a small percentage of scrap loss is pounced upon at once and is quickly corrected; but a production loss, due to lack of knowledge of the most recent improvement in mineral bonds for production foundry molding sand, will add up to the astounding figure of hundreds of thousands of dollars per month in loss of castings the foundry could have gotten had they this knowledge, and in a year this loss of castings, which could have been cast, reaches into the seven figures, yet this stupendous loss is painless, because this industry does not know that they can do any better.

When Bentonite is used together with MINCO BOND as the bonding agent in production foundry sand systems, FLOWABILITY and COLLAPSIBILITY are added to the molding sand bringing about an increase in production of castings per man hour of over 10%. This, to the production foundry industry is an astounding statement to make, but it is a very conservative statement from our experience. We will be very glad to substantiate this statement by practical demonstration and guarantee the work done when applied by one of our staff.

MINCO BOND is very economical. With it added to the sand you are now using, the two necessary qualities to get casting production are acquired, namely, FLOWABILITY and COLLAPSIBILITY.

You cannot get casting production without FLOWABILITY and COLLAPSIBILITY in your molding sand.

MINCO BOND is the only mineral bond known to modern foundry science today, which gives you both FLOWABILITY and COLLAPSIBILITY.

MINCO BOND IS SOLD WITH SERVICE AND GUARANTEED.

Write for our booklet

MINCO PRODUCTS CORPORATION

SAGINAW, MICHIGAN

WARNER R. THOMPSON CO.
7329 Hamilton Ave., Detroit, Mich.

THE BUCKEYE PRODUCTS CO.
7028-34 Vine St., Cincinnati, Ohio

MARTHENS COMPANY
1205 4th Ave., Moline, Ill.

FOUNDRY SUPPLIES CO.
461 W. 33rd St., Chicago, Ill.

THE HOFFMAN FOUNDRY SUPPLY CO.
1185 Main, Cleveland, Ohio

THE FOUNDRY SUPPLY CO., INC.
2295 University Ave., St. Paul, Minnesota

WOLVERINE FOUNDRY SUPPLY CO.
3211 Bellevue, Detroit, Mich.

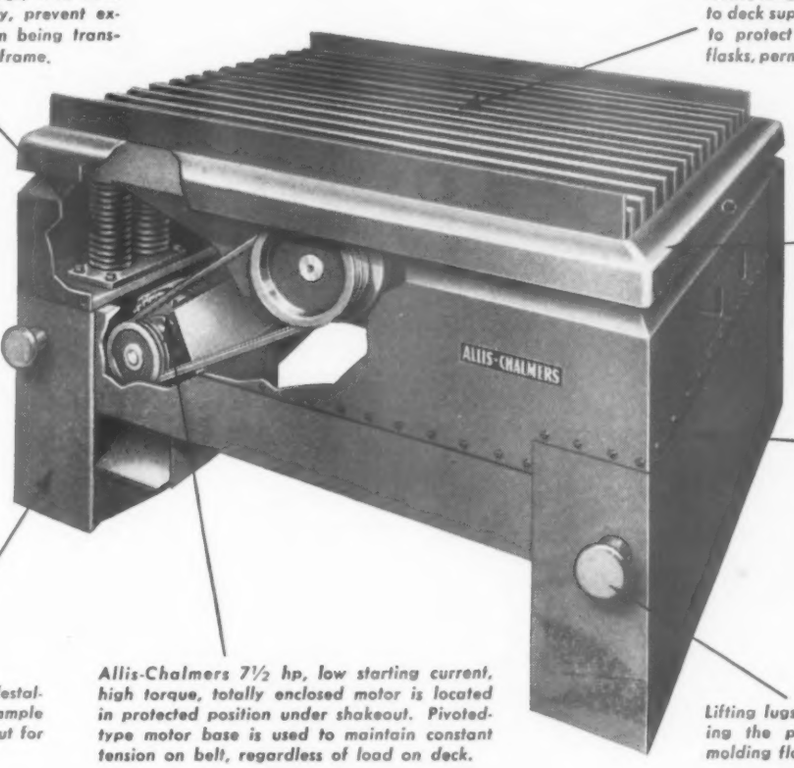
WM. R. BARNES COMPANY, Ltd., 263 Cumberland Ave., Hamilton, Ont.

MOLDEN Ltd., 381 Murray St., Montreal, Quebec

SHAMAHAN'S LIMITED, Vancouver, British Columbia, • SHAMAHAN'S LIMITED, Winnipeg, Manitoba

INDUSTRIAL FOUNDRY SUPPLY CO., Inc., San Francisco, Calif.

New Portable Shakeout To Aid Jobbing Foundries



Resilient support springs, 4 at each end of shakeout body, prevent excessive vibrations from being transmitted to supporting frame.

Heavy longitudinal skid bars welded to deck support frame are designed to protect frame, take impact of flasks, permit free discharge of sand.

Heavy reinforced sand deflector plate is welded directly to vibrating body.

Flat steel sand guard and support frame has no projecting structural members . . . protects V-belt drive, motor and mechanism. Opening in sand guard provided for inspection and lubrication.

Heavily designed pedestal-type frame allows ample space beneath shakeout for sand storage.

Allis-Chalmers 7½ hp, low starting current, high torque, totally enclosed motor is located in protected position under shakeout. Pivoted-type motor base is used to maintain constant tension on belt, regardless of load on deck.

Lifting lugs are employed for moving the portable unit from one molding floor to another by crane.

MILWAUKEE, WIS. — A 4′ x 6′ portable shakeout, for use in the foundry industry, is now offered by Allis-Chalmers. This newest addition to A-C's line of 2-bearing "Foundromatic" shakeouts makes possible quick, easy handling of average size flasks and castings.

The 4-ton capacity portable shakeout unit is equipped with lifting lugs for moving from one molding floor to another by crane. Totally enclosed motor is mounted underneath the 4′x6′ deck, out of the way. Pedestals allow plenty of room beneath the unit for sand storage.

Simple, 2-bearing construction on the new shakeout lowers operating and maintenance costs! Since flasks are uniformly vibrated, flask life is greatly increased. The high speed unit shakes out sand in *seconds*.

A-C now offers 8 sizes of 2-bearing shakeouts, to handle up to 25 tons.

Other Allis-Chalmers equipment to help save time and money in your foundry: Screens, Crushers, Blowers, Arc Furnace Substations, Kilns, Sand Conditioning equipment, Motors, Starters, Texrope Drives, Pumps.

For complete details, contact our nearby sales office, or write to ALLIS-CHALMERS, MILWAUKEE, WISCONSIN.

A 2056

ALLIS-CHALMERS

One of the Big 3 in Electric Power Equipment — Biggest of All in Range of Industrial Products

EQUIPMENT FOR THE FOUNDRY INDUSTRY

for more uniformly baked cores

your best bet is a MAEHLER CORE OVEN

...they're proved on the job

FOUNDRIES equipped with Maehler Core and Mold Ovens can reduce core baking time, produce more evenly baked cores, eliminate smoke in the core room and cut operating costs!

One of the big advantages of Maehler ovens is the recirculating air heat principle which assures exceptional heat uniformity (tests show uniformity within 10° F in a fully-loaded oven operating up to 500° F). This kind of temperature control means cores that are uniformly baked with no burning.

Here's what users say about Maehler Core Ovens

The Detroit Brass & Malleable Works reported that with their Maehler Recirculating Air Heat System on a six compartment metal oven they obtain perfect cores—have increased capacity and lowered costs.

After installing a Maehler Air Heat Oven, The Blackmer Pump Co. of Grand Rapids, Mich. reported baking time for small cores reduced 65%—for large cores 30%! ● ● ●

Maehler Core and Mold Ovens are available in a complete range of oil fired, gas fired and electrically-heated units.

· MAEHLER ·

THE PAUL MAEHLER CO., 2200 W. Lake Street, Chicago 12, Ill.

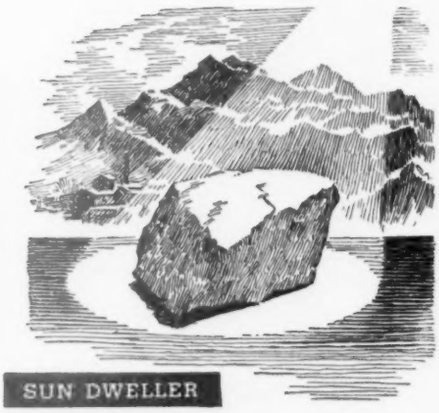
THE STORY OF VANADIUM

GODDESS OF BEAUTY

Vanadium compounds give beautiful colors in solution—lavender, green, deep blue, orange. That's why the Swedish scientist, Sefstrom, first to identify this metal, named it after Vanadis, the Norse goddess of beauty. That was back in 1830, but vanadium has been widely used in steelmaking only since 1900.

U.S. SELF-SUFFICIENT

Although vanadium is one of the rarer elements, it is widely distributed in the earth's crust. Colorado is one of the chief sources of this ore—supplying much of our domestic requirements. This is one of the cutting faces of a mine of the United States Vanadium Corporation (a Unit of UCC) at Rifle, Colorado.

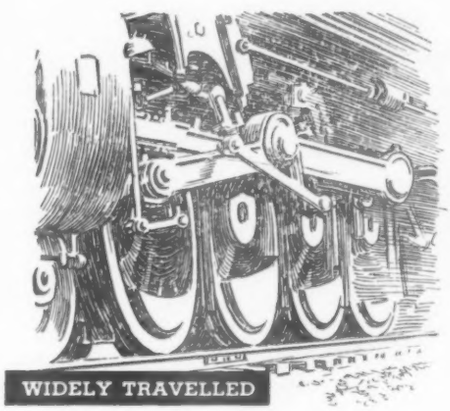


SUN DWELLER

With an appearance like silver and weight lighter than iron, vanadium has been found to exist on the sun. Steelmakers use it in the form of ferrovanadium, which contains 50-55 per cent vanadium. Ferrovanadium is produced from ore concentrates in several of Electro Metallurgical Company's seven plants.

LITTLE GOES A LONG WAY

Vanadium is a strong deoxidizer, but iron and steelmakers use it mainly for its alloying effect. Only 0.10 per cent—or less—is required in steel castings to refine the grain. In high-speed tool steels and chromium-vanadium steels a content of from 1 to 2 per cent vanadium imparts stability at high temperatures.



WIDELY TRAVELLED

In the railroad, shipbuilding, and automotive industries vanadium steels are extensively used for moving parts requiring high dynamic strength—such as leaf springs, rear axle gears, and heavy locomotive castings and forgings. Vanadium increases the impact strength of steel without sacrificing ductility.

If You Use Alloys . . .

You will want to have a copy of the booklet "Electromet Ferro-Alloys and Metals." It gives helpful information about vanadium and other alloying metals that Electromet supplies, as well as an explanation of the unique Electromet service to the iron and steel industries. This service puts at your disposal research, development, and engineering facilities to help solve your metallurgical problems. Write today to our Technical Service Department.

ELECTRO METALLURGICAL COMPANY
Unit of Union Carbide and Carbon Corporation
30 East 42nd Street UCC New York 17, N. Y.

ELECTROMET Ferro-Alloys and Metals are sold by Electro Metallurgical Sales Corporation, and Electro Metallurgical Company of Canada, Limited, Welland, Ontario.

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Research Leadership *back of Every Ingot*

APEX
ALUMINUM AND MAGNESIUM

Production of high-quality Apex Alloys demand exacting control of chemical composition. Through the means of a complete and modern spectrographic laboratory with its variety of equipment; spectrographs, densitometers, and accessories, Apex knows the exact analysis of alloys at a time when corrections can still be made. This is a further assurance of quality in the Ingot . . . another example of Apex Research Leadership Back of Every Ingot.

APEX SMELTING

Company • ***Chicago 12, Illinois***

SAVE
EXTRA HANDLING!

USE CMD *DUAL-PURPOSE CORE TRAYS*

The CMD Dual-Purpose Core Tray can be used for baking the cores, thus eliminating transfer of cores from core plate to core tray.

Because of their lock-stacking features, these trays make possible storage from the floor up. Bins and racks are no longer necessary.

SPECIFICATIONS

SIZE—12" X 24"

LOADING HEIGHT—4½"—6" OR 7"

OVERALL HEIGHT—5½"—7" OR 8"

WEIGHT—9½ POUNDS

MATERIAL—16 GA. SHEET METAL

SPOT WELDED (28 POINTS)

ALL ROUNDED CORNERS

2 BOTTOM REINFORCEMENT ANGLES

CONSTRUCTED FOR STACKING

CHICAGO MANUFACTURING & DISTRIBUTING CO.

Dept. 5F, 1928 West 46th St. CMD Chicago 9, Illinois

Airco Oxygen...

...ALL YOU NEED...WHEN YOU NEED IT!

Whether you need a hundred cubic feet or a million . . . whether you need an occasional cylinder or a constant supply of high purity oxygen . . . there's an Airco depot near you ready to meet all your requirements — with the right type of "package."

If your consumption of oxygen is large, the Airco trailer delivery system offers the greatest measure of convenience and economy. Oxygen is available in trailer capacities of approximately 10,000, 20,000, and 40,000 cubic feet. These can be placed at any suitable location of your plant.

If your consumption is moderate or small, Airco oxygen is delivered in standard steel cylinders in whatever number and frequencies best serve you. But whether small or large, your requirement is filled the way you want it.

Airco has always pioneered in the creation of new and better methods of oxygen delivery — and *Airco looks to the future!* Tomorrow, you can expect even more important improvements — thanks to Airco's foresighted research and development program.

For assistance in developing or improving an internal gas distribution system geared to your operations . . . talk with an Airco technical man. Write your nearby Airco office, or: Air Reduction, 60 E. 42nd St., New York 17, N. Y. In Texas: Magnolia Airco Gas Products Co., Houston 1, Texas.

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An interesting booklet . . . "Oxygen — Indispensable Servant of Industry" . . . is available. Fill in and mail this coupon for your copy.

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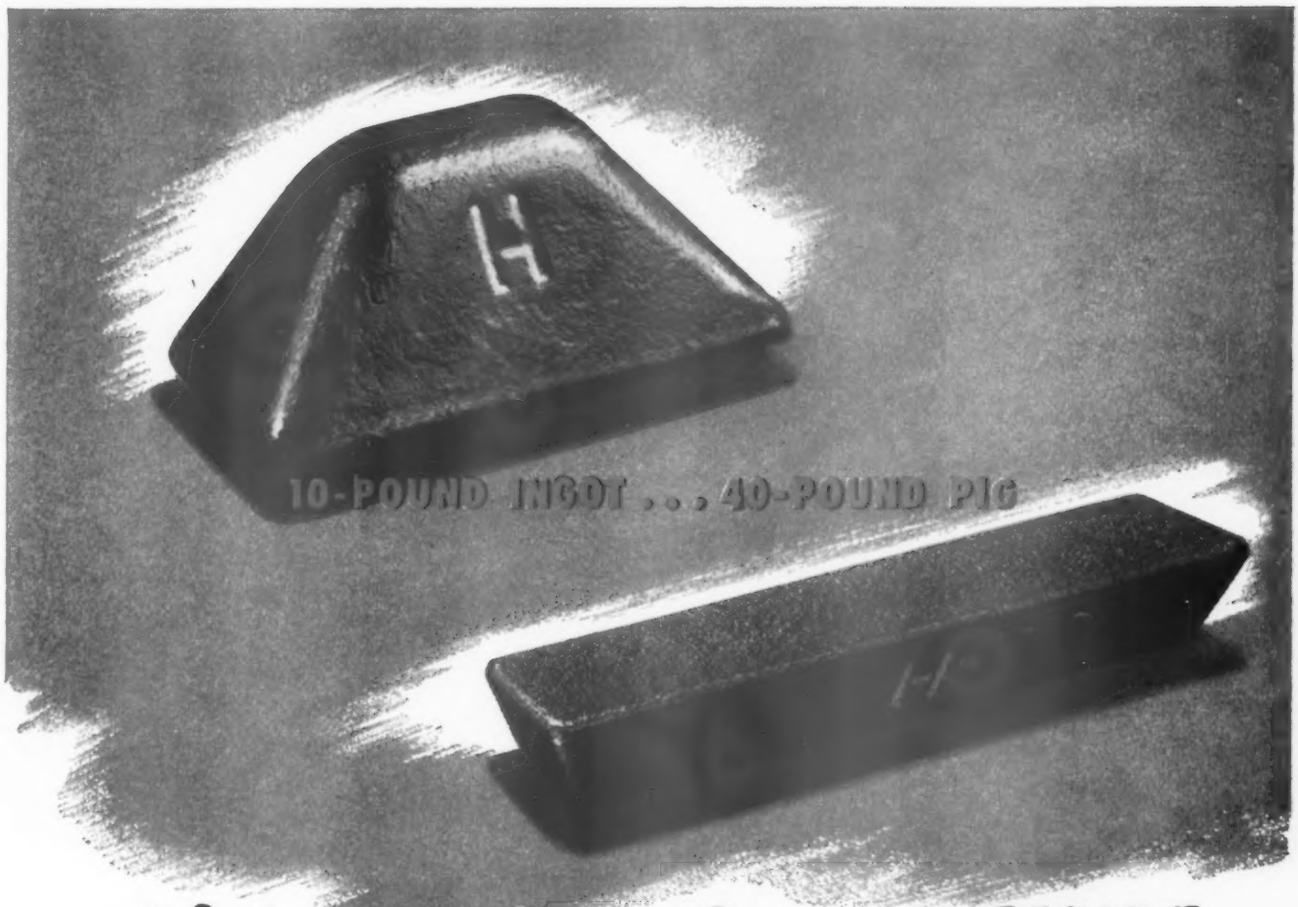
AIRCO **AIR REDUCTION**

Offices in All Principal Cities

ORIGINATORS OF MODERN OXYACETYLENE METHODS FOR THE METAL WORKING INDUSTRY



it's better iron from HANNA

For more than 75 years, Hanna Furnace has worked to provide foundrymen with better iron for better castings. Hanna Furnace is quality-minded . . . has always been willing to experiment and cooperate in the development of new ideas that lead to *more uniform* and *higher quality* castings . . . has made continuous progress in controlling crystal growth to insure finer grain structure, thus contributing to the *strength* of finished castings.

Whether you use the new 10-pound Hanna Ten ingot or the conventional 40-pound pig, you can be sure of best results with Hanna iron. A Hanna metallurgist will be glad to point out the specific advantages of both forms of Hanna iron. Just write or phone your nearest Hanna office.

THE HANNA FURNACE CORPORATION

BUFFALO • DETROIT • NEW YORK • PHILADELPHIA • BOSTON

MERCHANT PIG IRON DIVISION OF NATIONAL STEEL CORPORATION

Its Easy...

to BOOST PRODUCTION with MOLINE SQUEEZERS!

In eight hours, one Moline Squeezer—the No. 44 Heavy Duty Portable—produces 285 high quality molds! That's real production, and is one of the many reasons why more and more foundries are installing Moline Machines! They are finding it more profitable to replace their high priced, high maintenance cost machines with the Moline type best suited for their work.

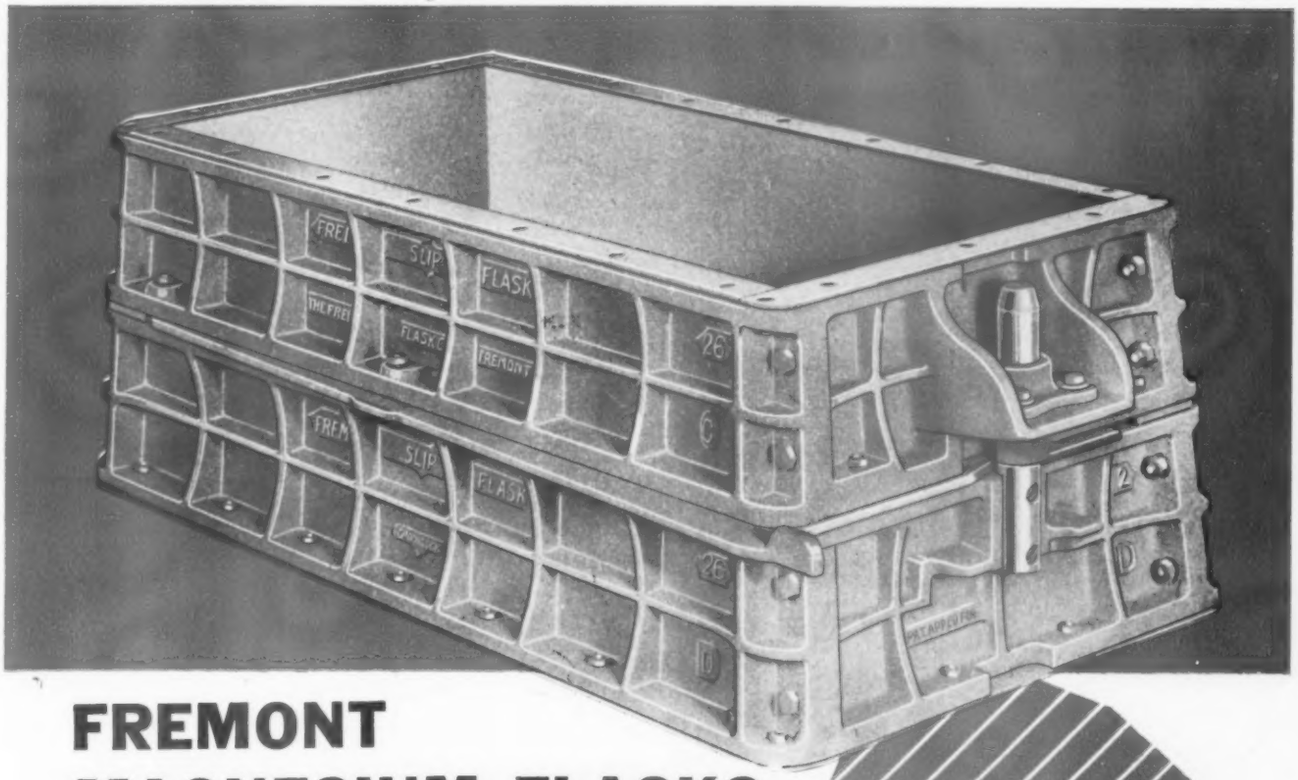
Yes, Moline Squeezers will make money for you by boosting production and reducing foundry cost . . . and with very little initial expense. Their simplified design, sturdy construction and easy operation make a hit with molders because it enables them to turn out a greater volume of high quality work.

Perhaps Moline Squeezers are the answer to some of your Molding problems, too.

MOLINE IRON WORKS
MOLINE, ILLINOIS, U. S. A.

There are four models of Moline Squeezers. Illustrated here is the No. 44 Heavy Duty Portable which will handle flasks 16" x 30" or under. Write to the factory for full information and prices.

MIW



FREMONT MAGNESIUM FLASKS

JACKETS furnished in CAST IRON or ALUMINUM

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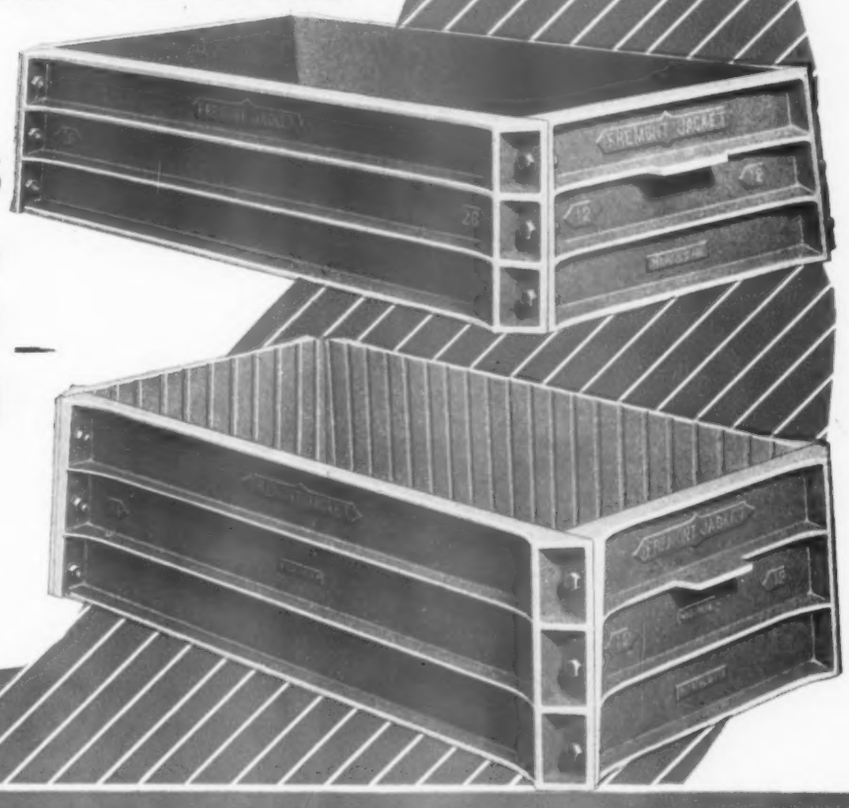
BUILT FOR LONG SERVICE AND FAST PRODUCTION



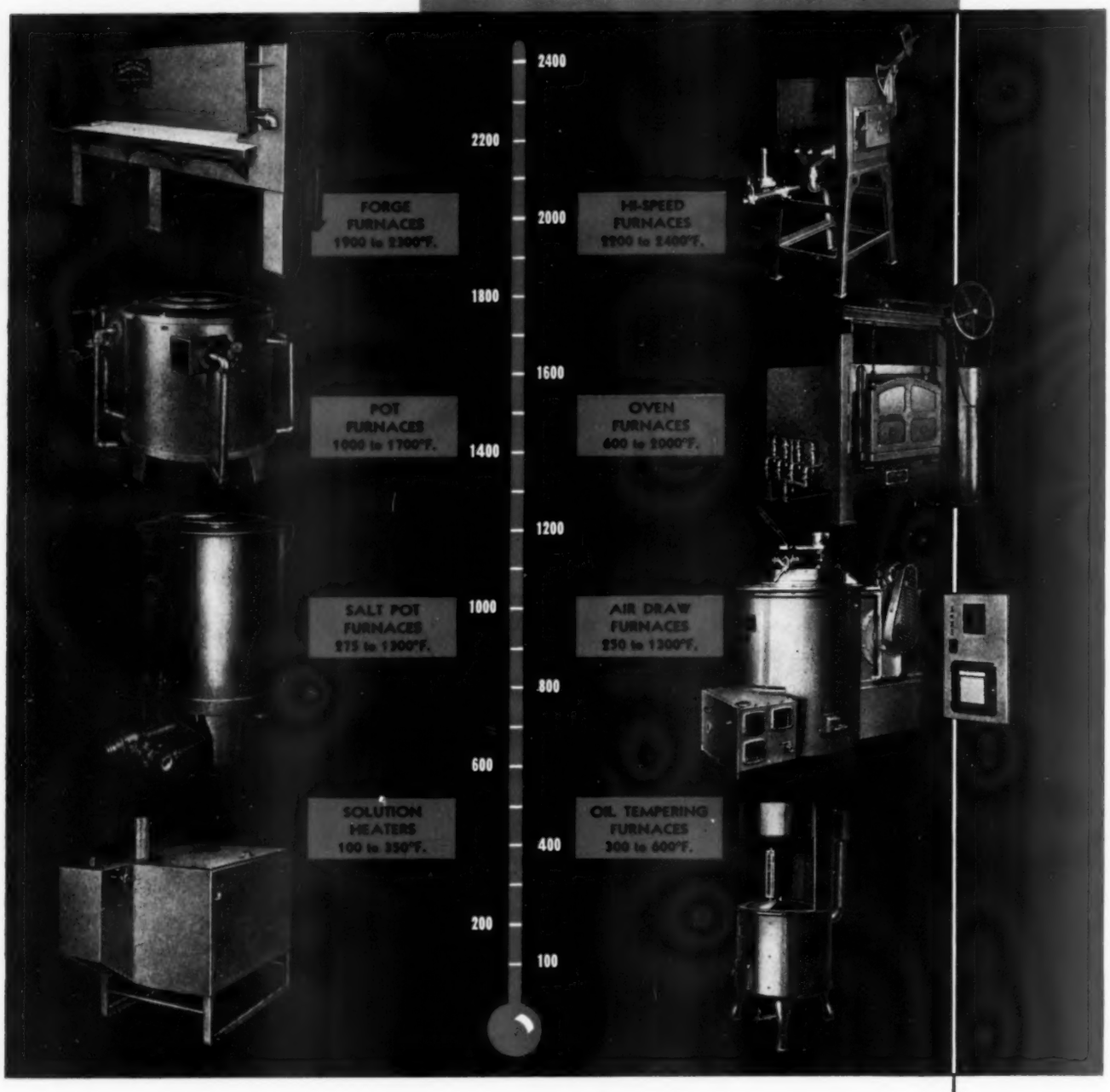
GROOVLOCK

THE FOOL-PROOF PIN

The FREMONT FLASK CO.

FREMONT, OHIO

WHAT DEGREE "FURNACE HEIT"?



From the top scale of hi-speed hardening to a low temperature cleaning operation a suitable Eclipse Unit can be selected to handle your metal working requirements. This complete line of furnaces is the product of the experience and development of over a quarter of century in the manufacture of Industrial Gas Fired Heat Treating Equipment. Consult our representative in your locality regarding your requirements.

Eclipse Fuel Engineering Company
ROCKFORD ILLINOIS

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VANCORAM FERRO SILICON

FOR HIGHER QUALITY . . . CLEANER STEELS

Exacting requirements imposed by consumers of steel make it necessary for the steel maker to use the purest ferro alloys available. That is why Vancoram Brand Ferro Silicon has found favor and extensive application in the production of higher grade, cleaner steels and irons that combine maximum physical properties with soundness and freedom from defects.

The uniform size, density and analysis of Vancoram Brand Ferro Silicon insure greater efficiency and economy and consequent improvement in product quality. To cover the varied uses of Ferro Silicon—as a deoxidizer and scavenger, and in the production of silicon-bearing steels and irons—we supply the following grades:

25 to 30% Ferro Silicon
SILICON....25 to 30%

50% Ferro Silicon
SILICON....47 to 52%

75% Ferro Silicon
SILICON....74 to 79%

80 to 85% Ferro Silicon
SILICON...80 to 84.9%

85 to 90% Ferro Silicon
SILICON...85 to 89.9%

90 to 95% Ferro Silicon
SILICON.....90 to 95%

MAKERS OF VANCORAM FERRO ALLOYS AND METALS

The above products are available from stock in lumps or crushed or ground to any required size. Our metallurgists will cooperate with you in the use of Vancoram Ferro Silicon for best results in the carbon and alloy steels you supply.

VANADIUM CORPORATION OF AMERICA

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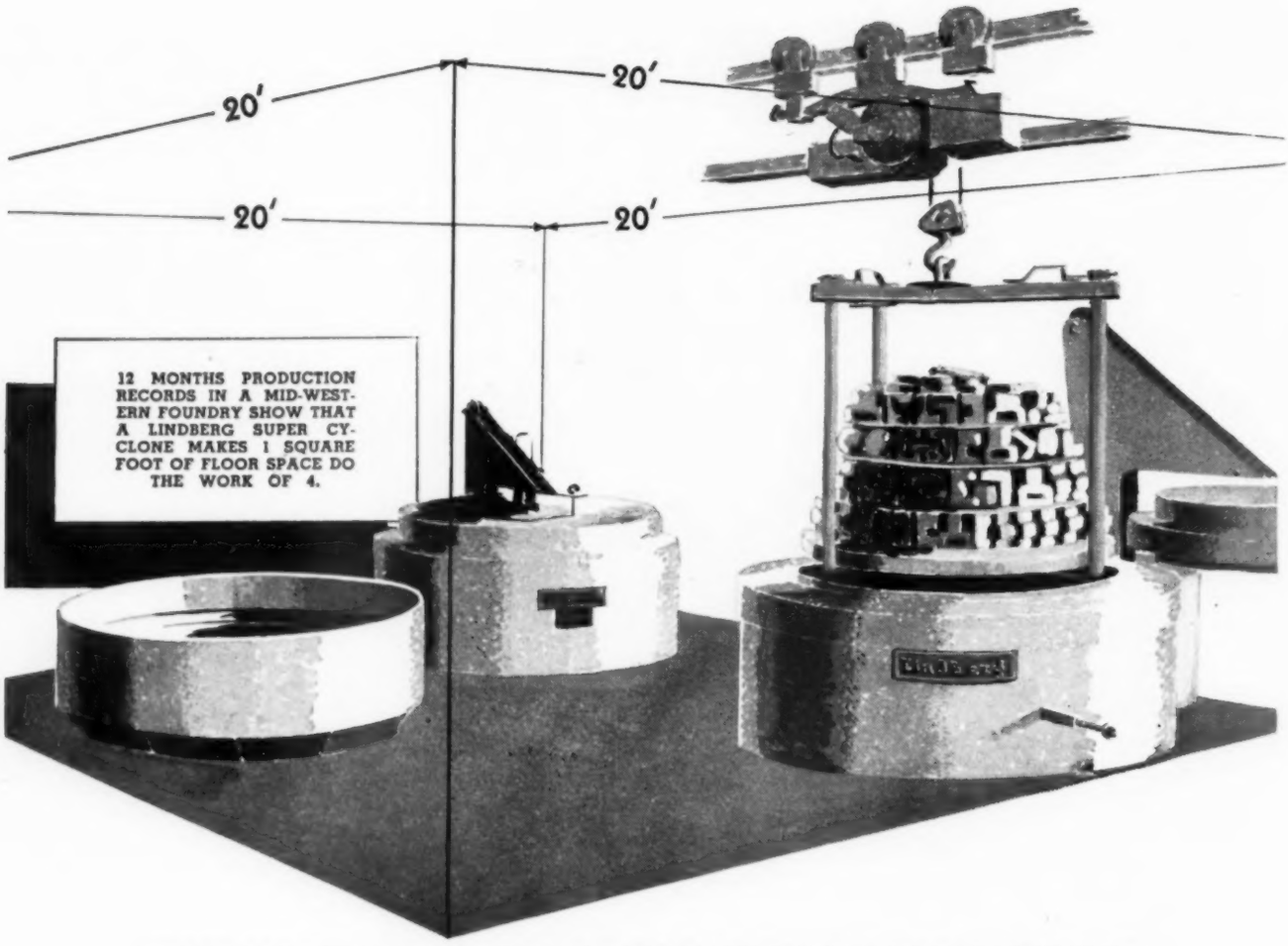
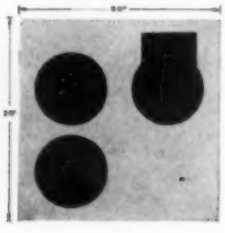

20′
20′
20′
20′
12 MONTHS PRODUCTION RECORDS IN A MID-WESTERN FOUNDRY SHOW THAT A LINDBERG SUPER CYCLONE MAKES 1 SQUARE FOOT OF FLOOR SPACE DO THE WORK OF 4.

HOW YOUR HEAT TREAT DEPARTMENT WILL PRODUCE 4 TIMES MORE PER SQUARE FOOT OF FLOOR AREA!

Are your heat treating requirements increasing? Do you have to increase your output—without using more floor space? Consider the Lindberg Super Cyclone! The production records for a period of twelve months in a mid-western foundry show that a Lindberg Super Cyclone makes one square foot of floor space do the work of four.

200 TONS MONTHLY IN 20′ BY 20′ AREA



48″ by 48″ Super Cyclone installation which includes insulated cooling pit, quench tank, and loading space, normalizes in only 400 square feet of floor space, as much work as a conventional car type furnace, requiring 1530 square feet in same plant.

MINIMUM HANDLING

Castings are loaded away from the furnace on fixtures or in work baskets. This method of handling improves working conditions for the heat treater, as loading and unloading is done away from furnace heat.

FORCED CONVECTION HEATING

The Super Cyclone produces more work because heat is blown through and around every part of the charge. A powerful blower fan does the job quickly,—and gives accuracy of heating never before obtained in production heat treating. Accurately heated air is forced to the center of the charge as well as to all other portions,—therefore nothing lags. No overheating of outside and underheating of middle. Every casting is heated alike.

Because of the forced convection principle, quick and controlled cooling is easily accomplished.

LINDBERG ENGINEERING CO.
2453 West Hubbard Street, Chicago 12, Illinois

Write for the 8 page bulletin No. 130, "Lindberg Super Cyclone"

LINDBERG FURNACES

Perfect Core Oil Helps Make Perfect Cores

A Cities Service engineer can be of great value to your foundry in giving information on our complete line of core oil and mold wash for the many exacting uses.

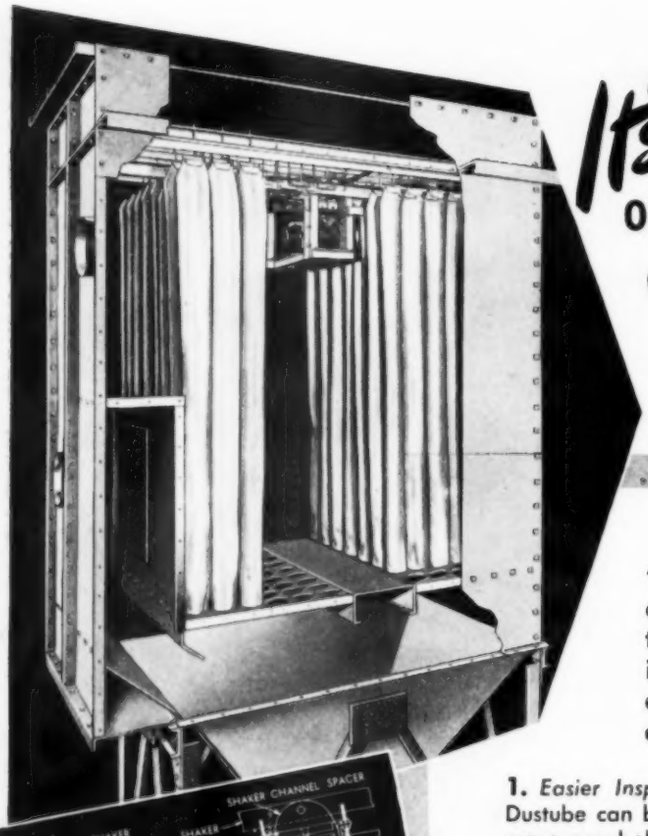
For all uses . . .

The general acceptance of Cities Service Products in the foundry industry has proven the outstanding quality of all Cities Service Products.

A Cities Service Engineer, with his vast experience in foundry procedure, can be of great help in selecting a product that will save you time, money, and effort in the great race of production. Times are changing rapidly, the needs for foundry men are reaching unexpected peacetime proportions, and Cities Service is at hand to help with your problems. Contact the office nearest you now, they can help you and give you immediate service and delivery.

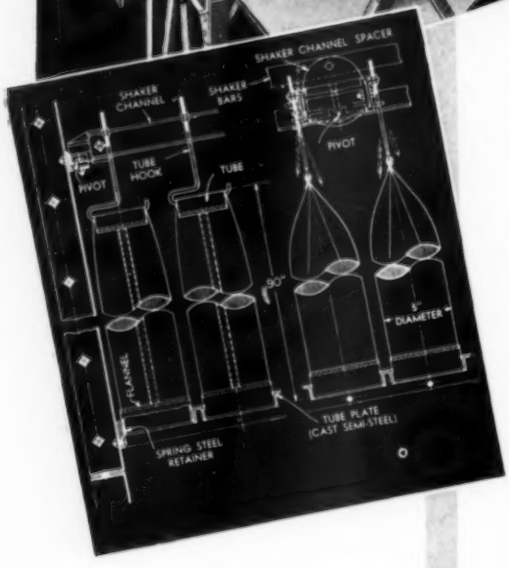
CITIES SERVICE

Chicago Tulsa | Cleveland Fort Worth | Detroit Shreveport | St. Paul Milwaukee | Cedar Rapids Toronto | Kansas City New York



It's Easy to See Why

OPERATING and MAINTENANCE COSTS ARE LESS WITH A DUSTUBE



"No other cloth-type collector is so simple and easy to operate and maintain" . . . that is what users, experienced in operating this type of equipment under varied conditions, say about DUSTUBE. And here are reasons why:

1. *Easier Inspection*—The condition of the cloth tubes in a Dustube can be instantly inspected. It is not necessary to remove any bolts, screens or frames to determine the condition of the tubes.

2. *Less Maintenance*—Tube changes, though infrequently required, can be made by one man working on the clean air side. The only tools he needs are his hands. In a contest held at a recent industrial show the winner changed a tube completely in 4.2 seconds!

As the tubes are never under tension and as absence of rigid screen frames eliminates any abrading or corrosive contact with metal and wire, the wear on the cloth of a Dustube is practically nil. Coarse, heavy dusts cannot scuff or abrade the cloth as only the very fine float dust reaches the tubes. Except for an infrequent shaking of the tubes, Dustubes require only a minimum of attention.

3. *Low Operating Cost*—Operating costs are confined to supplying power for operating the fan and shaker and an occasional replacement of an inexpensive cloth tube. There are few working parts to wear. Power costs are exceptionally low due to the ample spacing of the tubes which decrease resistance to air flow. Ample expansion areas on both the clean and dirty air side of the collector insure lower air velocities thereby increasing tube life, reducing power requirements, and providing a better distribution of dust and air throughout the entire unit.

Get full facts on Dustube—Write for Catalog No. 72

DUSTUBES
Serve Foundries Like These

Campbell, Wyant & Cannon Fdy.
American Steel Foundries
National Mall. & Steel Castings
S. K. Wellman Company
Ohio Steel Foundry Co.
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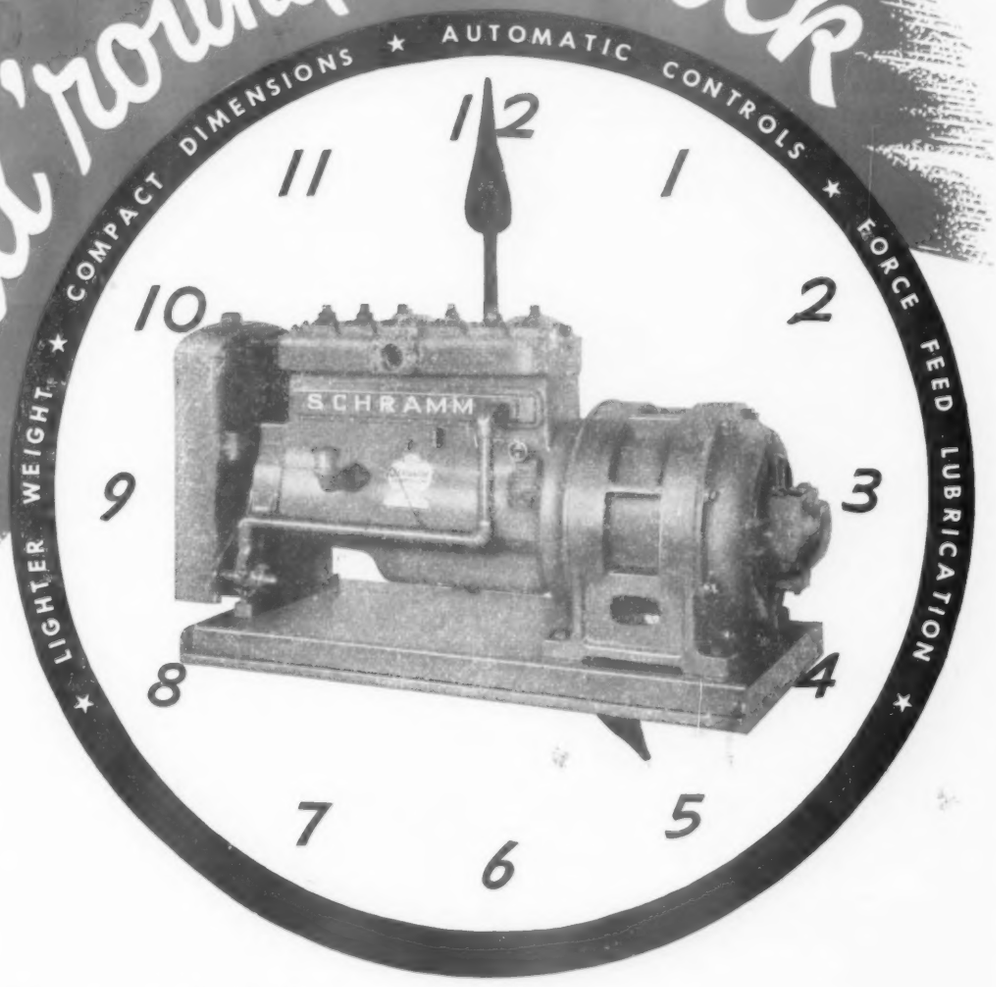
dustube DUST COLLECTORS

All 'round the clock

LIGHTER WEIGHT ★ COMPACT DIMENSIONS ★ AUTOMATIC CONTROLS ★ FORCE FEED LUBRICATION ★



SCHRAMM FOR DEPENDABLE PERFORMANCE

THIS WAS OUR ANNIVERSARY GREETING TO THE AMERICAN FOUNDRYMAN'S ASSOCIATION ON THEIR 50th ANNIVERSARY

Schramm, Incorporated was glad of the opportunity to participate in this celebration and also furnish compressed air to exhibitors, just as we have for many years at the Foundryman's Association Conferences, providing air to those companies demonstrating their machines on these important occasions

BUILT IN SIZES FROM 2 to 600 CU. FT. DISPLACEMENTS

Write for Catalog No. 45

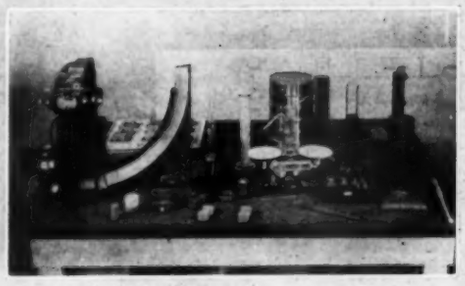
SCHRAMM, INC., WEST CHESTER, PENNSYLVANIA

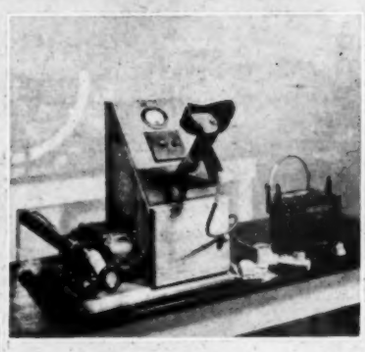
SCHRAMM *The Compressor People*

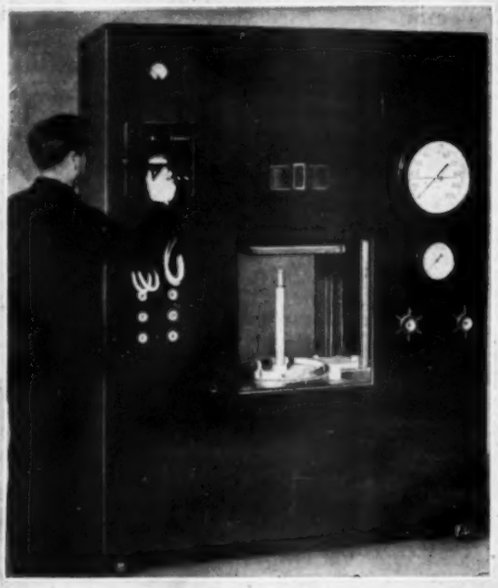
TO MORE SCIENTIFICALLY SERVE THE FOUNDRY INDUSTRY

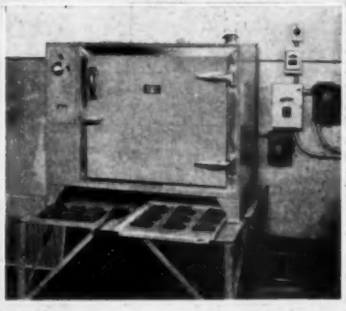
The Most Completely Equipped Laboratory Devoted Exclusively to Research and Development of Foundry Products

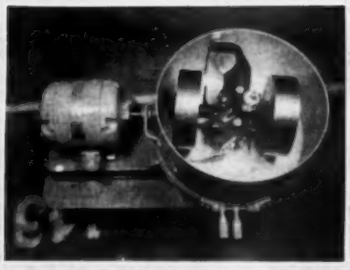
A section of DELTA'S foundry products research laboratory shown below contains such essential laboratory facilities as: Core Testing and Tensile Machines; Most Modern, Most Scientific type of Dilatometer; Specially Designed Core Baking Oven with delicate temperature adjustment and control; Sintering Machine, Sand Muller and all other necessary physical and chemical testing and analytical equipment.











Scientific Labo

of DE

EVERY DELTA FOUNDRY PRODUCT IS SCIENTIFICALLY DEVELOPED TO DO A PARTICULAR JOB... BETTER

Extensive laboratory facilities are devoted to research and development of DELTA Foundry Products. Modern scientific apparatus and equipment... every requirement of a completely equipped foundry laboratory... play a vital part in a continuing program of product development and standardization.

Every foundry product conceived and developed in DELTA Research Laboratories is first tested and passed in laboratory technique. It is then submitted for use and final approval in actual foundry practice before it is identified with the name "DELTA".

Every step in the manufacture of DELTA Foundry Products is supervised by skilled technicians of the DELTA chemical staff. All physical, mechanical and scientific factors are coordinated to safeguard quality and insure absolute uniformity in the finished product.

DELT

MA CTU

boratory Control Insures Uniform High Quality

ELTA FOUNDRY PRODUCTS

DELTA CORE & MOLD WASHES

BASE MATERIAL

Mix with silica flour and water to produce finished base.

FOR STEEL
STEELKOAT
SPECIAL CORE & MOLD WASH

FOR GREY IRON AND MALLEABLE
GRAKOAT – BLACKOAT

FOR ALUMINUM
GRAKOAT A-1

FOR NON-FERROUS METALS
NON-FERRUSKOAT

FOR ALL SAND CAST METALS
THERMOKOAT – It's Plasti-Lastic

OTHER DELTA FOUNDRY PRODUCTS

PARTEX (Nut Shell Parting)
LIQUID PARTING
CORE ROD DIP OILS
CORE OILS AND BINDERS
SPRAY BINDERS
NO-VEIN COMPOUND
MUDDING AND PATCHING COMPOUND
SAND CONDITIONING OILS
CHILLKOAT

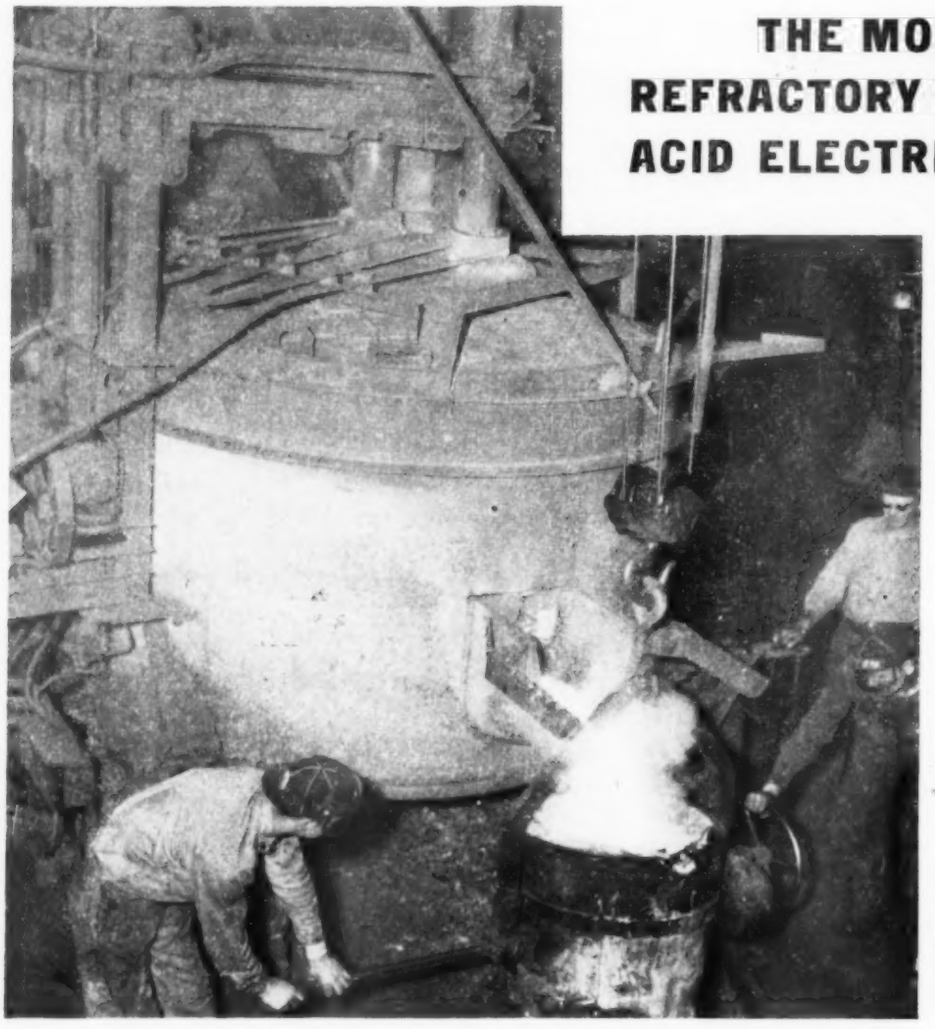
LTA OIL PRODUCTS CO.

MAN CTURERS OF INDUSTRIAL & AUTOMOTIVE OILS, GREASES AND COMPOUNDS

MILWAUKEE 9, WISCONSIN

IRONTON CARO-LINE

THE MONOLITHIC REFRACTORY MATERIAL FOR ACID ELECTRIC FURNACES



"Ironton Caro-Line" is used in electric steel foundries all over the United States and is also being used in Canada, Mexico and Chile.

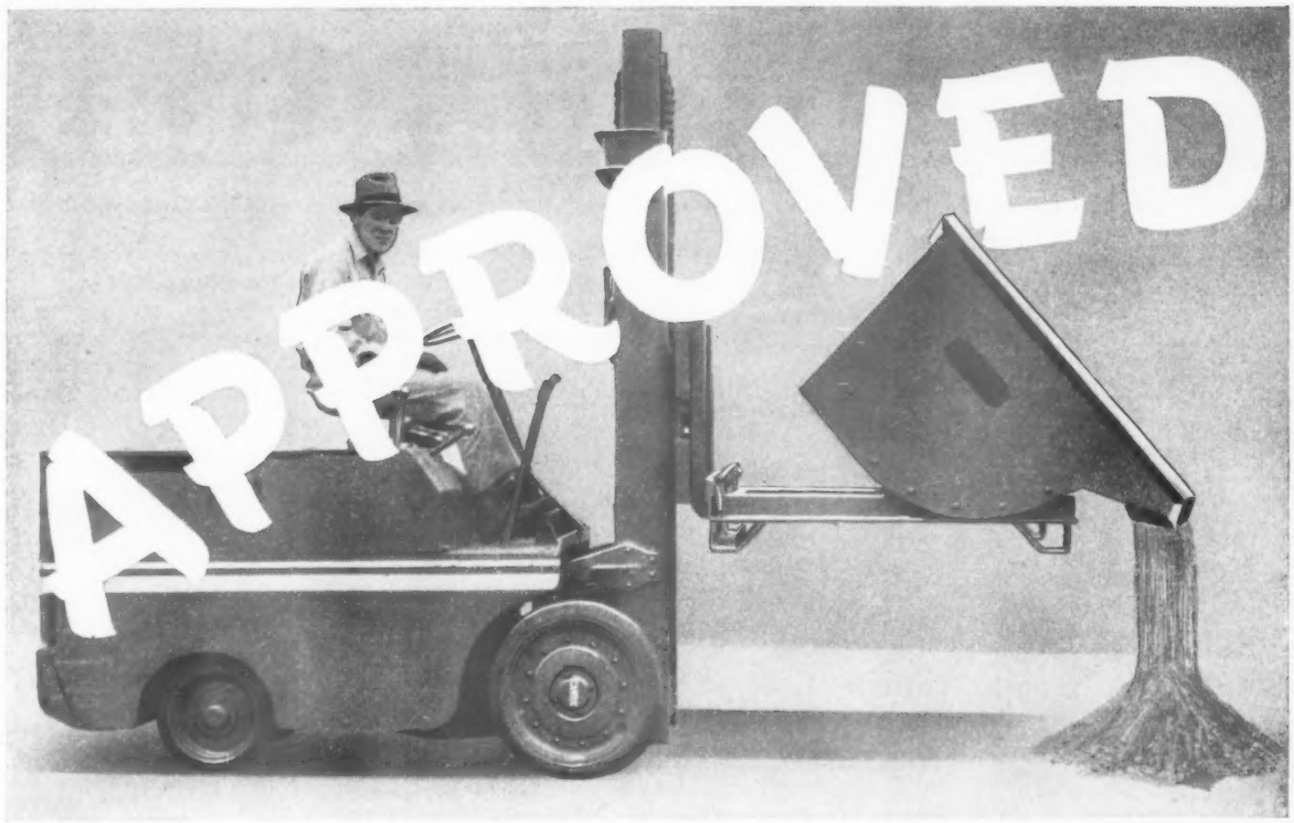
"Ironton Caro-Line" siliceous ramming refractory is being used by Skagit Steel and Iron Works at Sedro-Woolley, Washington, where this Greene electric furnace is in operation. Mr. Jack Hebert, the Foundry Superintendent uses it in the furnace bottom and for lining his ladles. He says, "We are very much pleased with our results from Ironton Caro-Line".

Ask us for data on this unusual refractory materiai.

THE IRONTON FIRE BRICK COMPANY

RELIABLE REFRACTORIES

IRONTON OHIO



BY USERS EVERYWHERE

ROURA SELF-DUMPING HOPPERS!

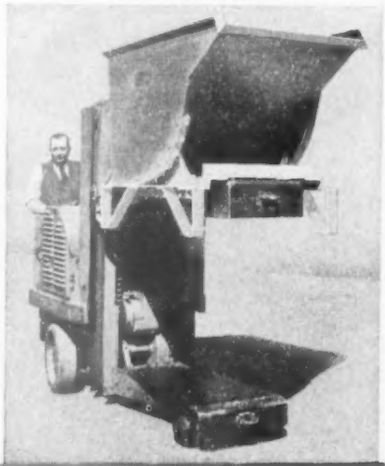
No slow, tiring hand work. Automatically dumps, levels and relocks. Only one simple manual operation.

Fits any standard fork or platform type lift truck. Sturdily balanced for carrying and dumping.

Because THEY SAVE MONEY by doing every type of bulk handling job you have . . . REDUCE FATIGUE 50% and save time with PERFECT SAFETY— leading industries throughout the country use ROURA Self-Dumping HOPPERS.

Handle any bulk material in your plant . . . hot, cold, wet or dry . . . without slow hand transferring fatigue slow-down, danger of injury from excessive lifting or dropping.

STANDARD (1 cu. yd.) MODEL $100.00 . . . F.O.B. Detroit. 30-day test free. Write for NEW DETAILED BULLETIN today.



ROURA IRON WORKS

1405 Woodland Avenue, Detroit 11, Michigan

"Pep Up" Performance of Your Air Tools with CLECO ACCESSORIES

Remember the best pneumatic tools will work even better using the proper accessories from the Cleco quality line

BOWES COUPLINGS

Universally preferred for over 35 years, Bowes Couplings are used on compressed air-lines, and hose lines for gas, water, oil and liquids. Absolutely tight on pressures from 10 lbs. up, they are mechanically locked, and cannot be disconnected accidentally. A simple push and quarter twist connects, while a slight pull on locking sleeve, with a quarter turn, permits instant separation. Available in 6 styles and in many sizes from ¼" to 1½" hose or pipe ends. Supplied in bronze or "Clevetrated" steel that resists corrosion.

Ask for – **BULLETIN 78A**

describing these items plus Veribest Air Hose, Neverslip Hose Clamps, Hose Menders, Line Strainers, etc.

AIR VALVES. Leak-proof, non-corrosive and always air tight because the air holds the plug on its seat. No packing is used. Sizes 1" or smaller equipped with waste-port which bleeds the air from the hose when the line is shut off—a "safety-first" feature. Larger sizes so equipped on order. Handle position readily shows whether valve is open or shut.

STYLE PO
Parallel ports. Large, clean air passage; no abrupt turns to cause friction. Outlet sizes from ¼" to 1¼".

STYLE A
The 30° angle valve; when connected hose-to-pipe, the former falls away free from valve. Sizes ½" to 1"

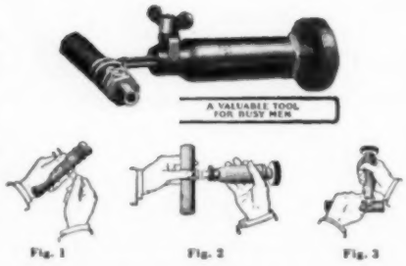
STYLE SR
For vertical or horizontal pipe-to-pipe or pipe-to-hose connections. Sizes from ¼" to 1½".

STYLE RA
For right angle connections for molding machines, manifolds, etc. Sizes from ¼" to 1".

STYLE FWL
A four-way valve. Handle movement controls supply to, and exhaust from both ends of cylinder with double-acting piston. Sizes from ⅛" to 1".

STYLE LW
Controls supply and exhaust to and from a cylinder with single-acting piston. Outlet sizes ⅛" to 1" pipe.

BLOW GUNS. Handy and economical for every foundry and shop. These guns have a shrouded thumb button to prevent breaking or bending the valve stem. Guns are rubber coated when so ordered at small additional cost. Available with drop forged stainless steel or cast bronze bodies, in ¼" and ⅜" sizes, with straight or curved nozzles. (Use Cleco Grooved Hose Nipples with these guns.)



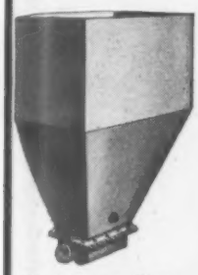
HOSE CLAMP TOOL. This handy tool secures wire clamps to hose and fittings as follows: Fig. 1. The wire form illustrated is first placed across the hose and held by the left thumb while the right hand bends it around the hose, drawing the two loose ends through the loop. Fig. 2. The tool is then applied, the loose ends of the wire entering corresponding holes in the tool, where they are securely gripped by turning the thumb nut. Fig. 3. Turning the hand wheel forces the grooved end of the plunger against the wire loop. When the wire is sufficiently tight, the tool is turned over forward, thus securing the loose ends to the loop. The wire ends are then released and clipped off close, and finally are tapped down snugly to the hose. Wires available for hose from ¼" to 1".

THE CLEVELAND PNEUMATIC TOOL COMPANY

Branch Offices In All Principal Cities • 3781 EAST 77th STREET, CLEVELAND 5, OHIO

FOUNDRY Equipment

SPECIAL PURPOSE EQUIPMENT

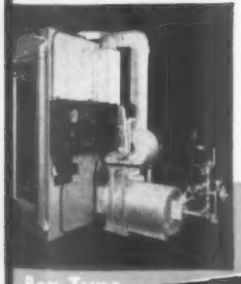


Sand Storage Bins

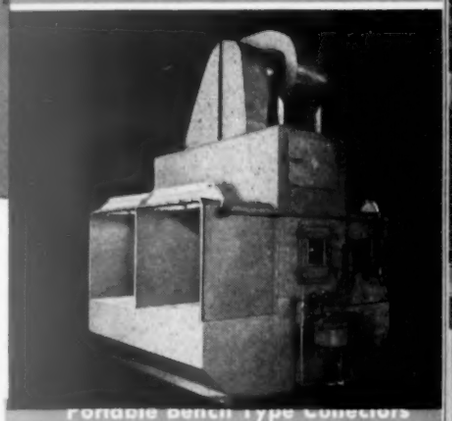
Pickling Tanks with Exhaust

Mould Racks (Conveyor)

Core Rack Trucks



Hydro-Foam Dust Collectors



Portable Bench Type Collectors

Sand Mould Spray Booths

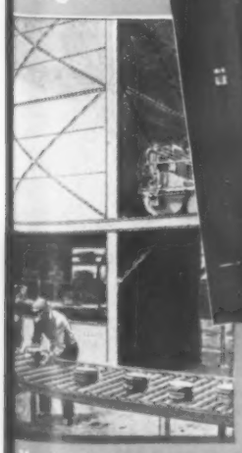
. . . Equipment Designed to do a Specific Job with Greatest Efficiency and Utmost Economy

The Mahon organization, through its close contact with foundrymen throughout the country, is today away ahead of demands for new methods and new labor-saving, cost-reducing equipment. Several of the foremost foundries in this country, have been equipped with complete Mahon systems for baking, spraying and drying cores and moulds...in each instance, these complete systems were planned and engineered with perfect coordination and balance to do a specific job at lowest possible unit cost. Regardless of what your present equipment requirements may be—from a small batch-type bake oven, to an elaborate conveyorized system—Mahon engineers will gladly give you the benefit of their vast experience in the foundry equipment field. Address correspondence to Foundry Equipment Division.

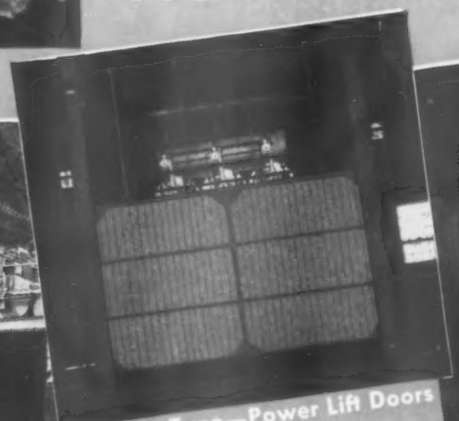
THE R. C. MAHON COMPANY

HOME OFFICE AND PLANT, Detroit 11, Mich. • WESTERN SALES DIVISION, Chicago 4, Ill.

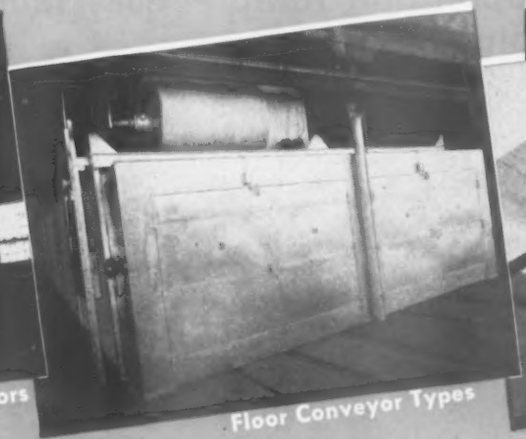
FOUNDRY OVENS OF ALL TYPES



Box Type Swing Doors



Box Type—Power Lift Doors

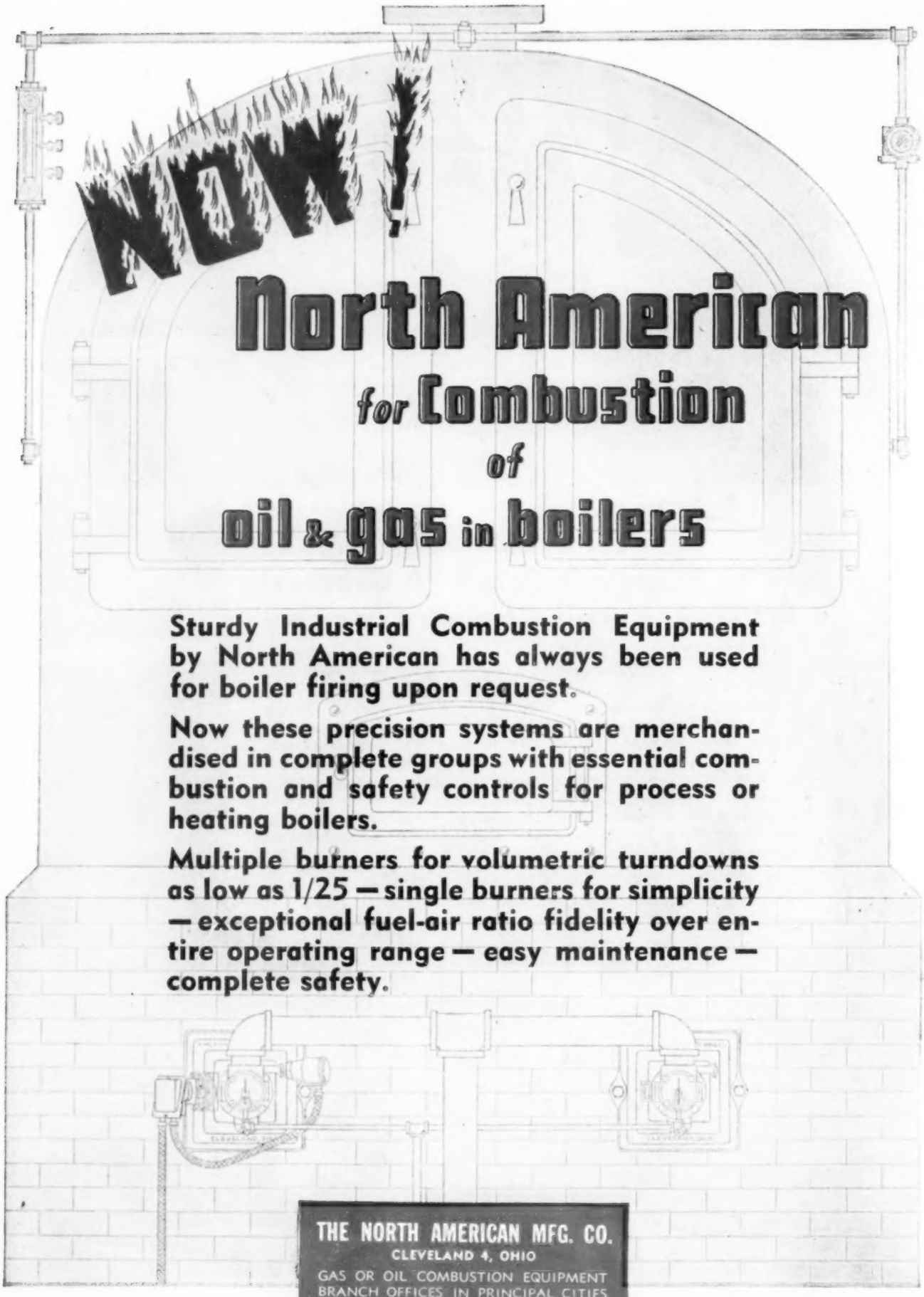


Floor Conveyor Types

Filtered Air Supply Systems

Vertical Conveyor Types

MAHON



Sturdy Industrial Combustion Equipment by North American has always been used for boiler firing upon request.

Now these precision systems are merchandised in complete groups with essential combustion and safety controls for process or heating boilers.

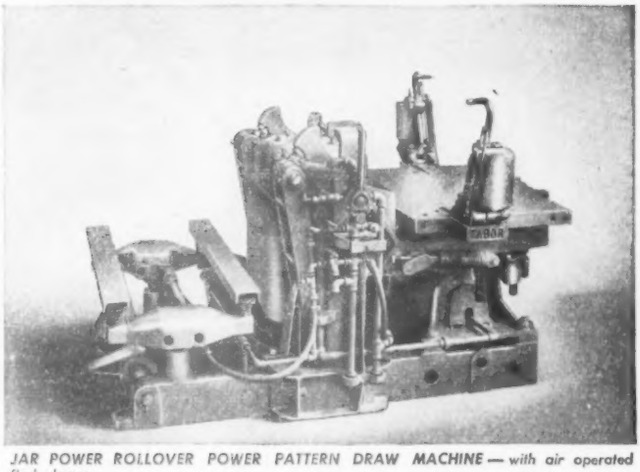
Multiple burners for volumetric turndowns as low as 1/25 — single burners for simplicity — exceptional fuel-air ratio fidelity over entire operating range — easy maintenance — complete safety.

THE NORTH AMERICAN MFG. CO.
CLEVELAND 4, OHIO
GAS OR OIL COMBUSTION EQUIPMENT
BRANCH OFFICES IN PRINCIPAL CITIES

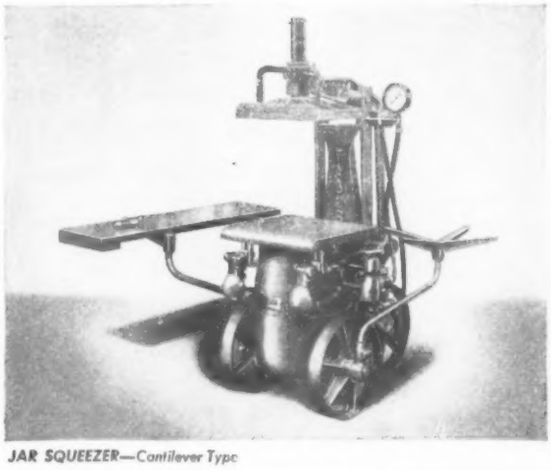
FOUNDRY MOLDING MACHINES

TABOR
TRADE 1884 MARK

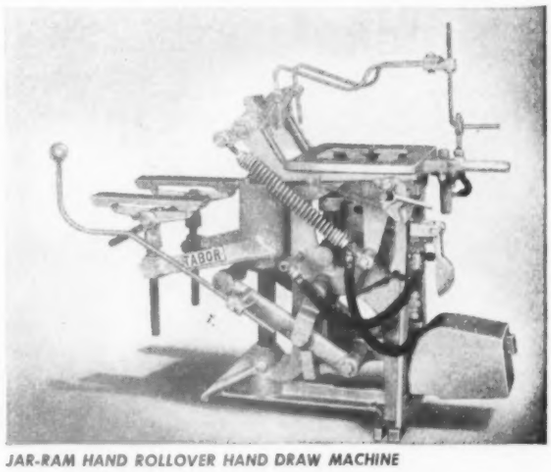
JAR SQUEEZER—Yoke Type



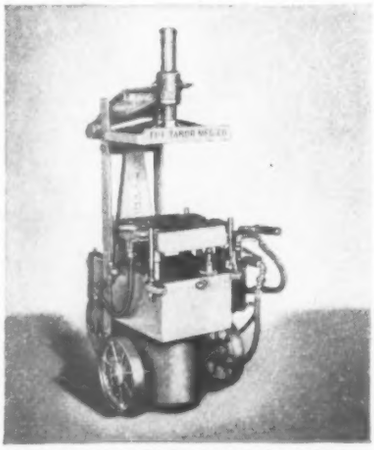
JAR POWER ROLLOVER POWER PATTERN DRAW MACHINE — with air operated flask clamps



JAR SQUEEZER—Cantilever Type



JAR-RAM HAND ROLLOVER HAND DRAW MACHINE



PORTABLE JAR SQUEEZE FLASK-LIFT MACHINE—with adjustable lifting pins.

. . . and TABOR-BRASIVE CUT-OFF MACHINES

Save time, labor and money in cutting gates and risers from castings of manganese bronze, aluminum bronze, nickel, Monel and other non-ferrous alloys, as well as alloy steel. Built in sizes and types to meet any cutting need.

MEMBER
MANUFACTURERS ASSOCIATION INC. FOUNDRY EQUIPMENT

The several types shown here are representative of the complete line of Tabor Foundry Molding Machines. Tabor can supply the right type of machine for any molding need . . . to gray iron, steel and non-ferrous foundries of any size.

Write us regarding your foundry machine requirements.

Since 1884 . . . MANUFACTURERS OF FOUNDRY MOLDING MACHINES

THE TABOR MANUFACTURING CO.

6225 Tacony Street • Philadelphia 35 • Pennsylvania

Representatives: Snyder Foundry Supply Co., Los Angeles, Cal.; Gallagher Foundry Supply Co., San Francisco & Oakland, Cal.; Carl F. Miller & Co., Seattle, Wash.

Check list
for Peacetime Operation

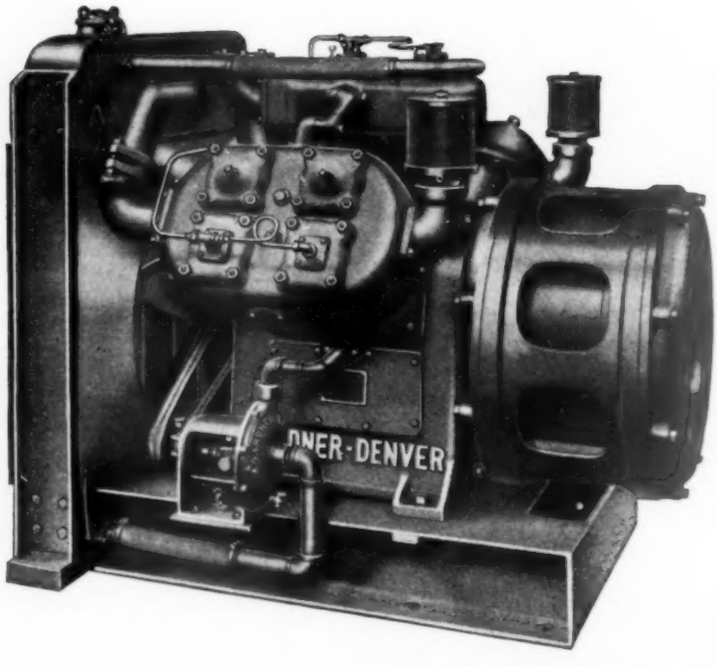
Equipment has suffered during the war. Your compressor, for example, may have had to run extra long hours without adequate attention and may need to be replaced to assure dependability and low operating costs.

The Gardner-Denver "WB" Vertical Water-cooled Compressor provides a dependable, low-cost source of air power. Its rugged construction and advanced design have established long records of economical service. Cylinders and compression heads are completely water-jacketed to assure continuous operation. Compact, the "WB" takes but little space and requires no outside piping—installation is simple.

Check your compressor—it may need replacement. Replace with Gardner-Denver and be assured of dependable, low-cost service. For complete information, write the Gardner-Denver Company, Quincy, Illinois.

GARDNER-DENVER

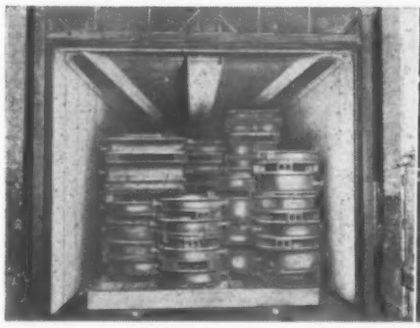
Since 1859



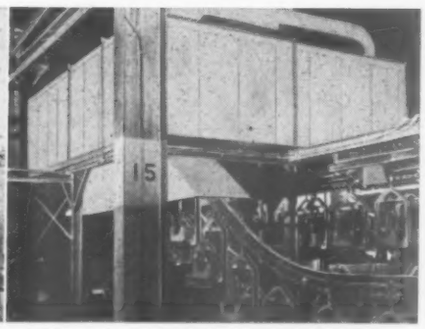
Gardner-Denver Two-Stage Vertical Water-cooled Compressor. Capacity 142 to 445 cubic feet per minute.

INVEST NOW

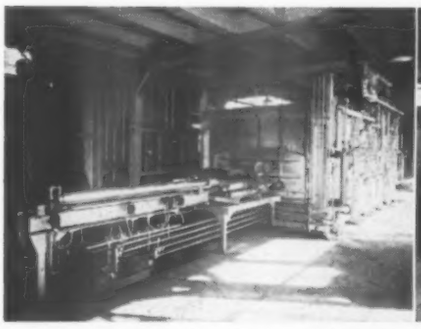
In More Uniform • Faster Heating at Lower Cost-



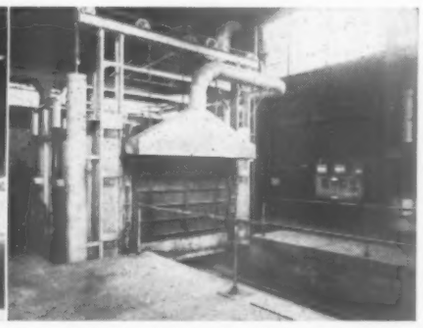
Gehnrich mold drying oven, equipped with power-operated lift doors; heats a gross load of 150 tons; recirculation heated uniformly (note heat distribution ducts) from an oil-fired heater built integrally with rear oven wall.



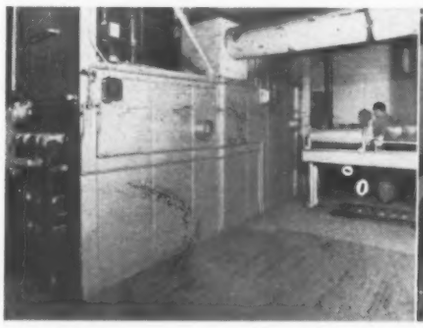
Gehnrich continuous core spray drying oven, for 4-pass counterflow, 200 ft. travel of work on racks; heated by gas-fired, external air heaters and full length recirculation system; oven mounted above floor, saving useful floor space.



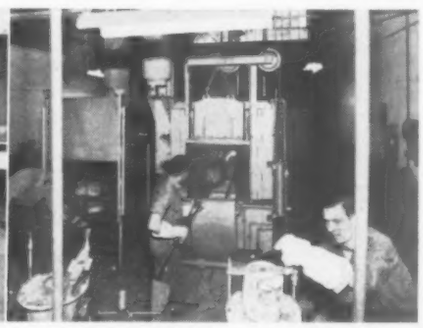
Rockwell gas-fired, pusher-tray furnace for annealing large rear axle housing castings; pusher and puller mechanisms and furnace doors interlocked and operated in automatic time cycle.



Rockwell car bottom type, oil-fired furnace with bridge wall firing, providing uniform heat distribution to heavy load, without direct flame impingement on the work.



Gehnrich oven for drying refractory molds and melting out wax investments in precision casting; heated by air from the mold heating furnace, shown at right; trucks moved by air cylinder.



Rockwell gas-fired furnace for preheating (at 1100° F.) and heating (at 1400° F.) refractory molds and castings; work moves by air cylinder pusher; work being removed to put into cooling station at left.

CONVERT

Inefficient Baking, Drying and Heat Treating to Improved Operation with

GEHNRICH OVENS AND ROCKWELL FURNACES

In practically every foundry heating operation from baking cores in small pull-drawer or truck ovens, to heat treating of aluminum or magnesium castings in batch or continuous conveyor ovens through crucible melting of non-ferrous metals and final annealing of castings of all sizes and quantities in car type or continuous furnaces, you'll find it wise to depend on the 57 years' experience of Rockwell-Gehnrich engineering.

Every foundry heating problem is individually treated and solved on the basis of improved heat processing for better production economy. You'll find that applied—as have hundreds of foundries everywhere—whether you need a cabinet oven or a large pusher type or continuous conveyor oven or furnace.

Here are a number of interesting bulletins on how Gehnrich Ovens and Rockwell Furnaces can help your foundry practice.

THEY'RE FREE—WRITE

W. S. ROCKWELL COMPANY
210 ELIOT ST. • FAIRFIELD, CONN.

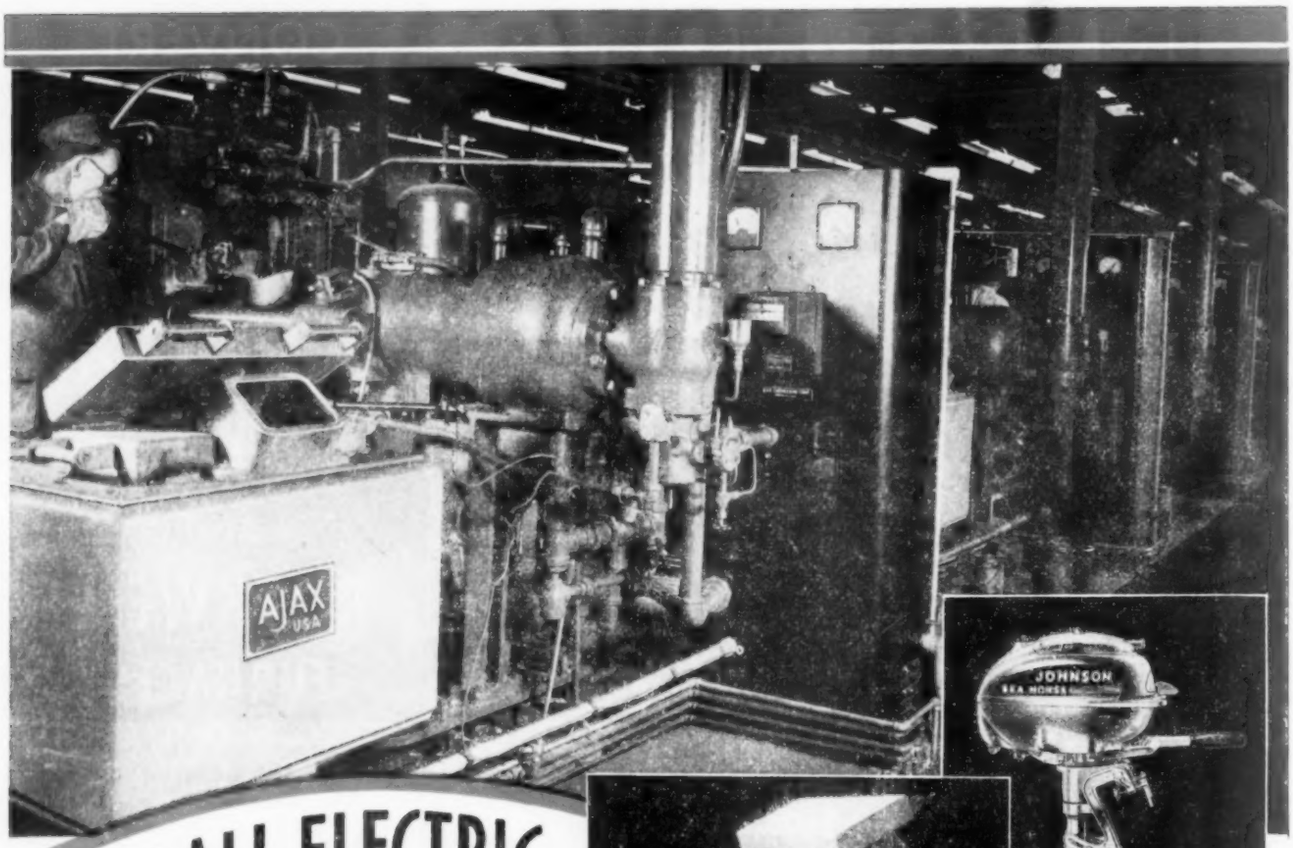
Please send me the following:

- ☐ Gehnrich Foundry Ovens.
- ☐ Gehnrich Ovens for Metal Finishing.
- ☐ Rockwell Pusher Type Furnaces.
- ☐ Rockwell Car Bottom Furnaces.
- ☐ Rockwell Conveyor Furnaces.
- ☐ Rockwell Oven Furnaces.
- ☐ Rockwell Crucible Melting Furnaces.

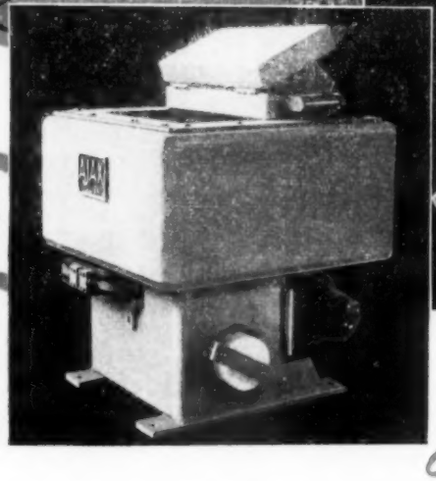
*Name*_____

*Company*_____

*Address*_____



FIRST ALL ELECTRIC DIE CASTING PLANT



JOHNSON *SeaHorse*
OUTBOARD MOTORS

THE photograph above shows a part of the Aluminum Alloy Die Casting Shop of the Johnson Motors Division of Outboard Marine & Manufacturing Company, located at Waukegan, Illinois, U. S. A. This is the first die casting plant in the world to use exclusively electric furnaces for melting and holding the metal to be processed in die casting machines.

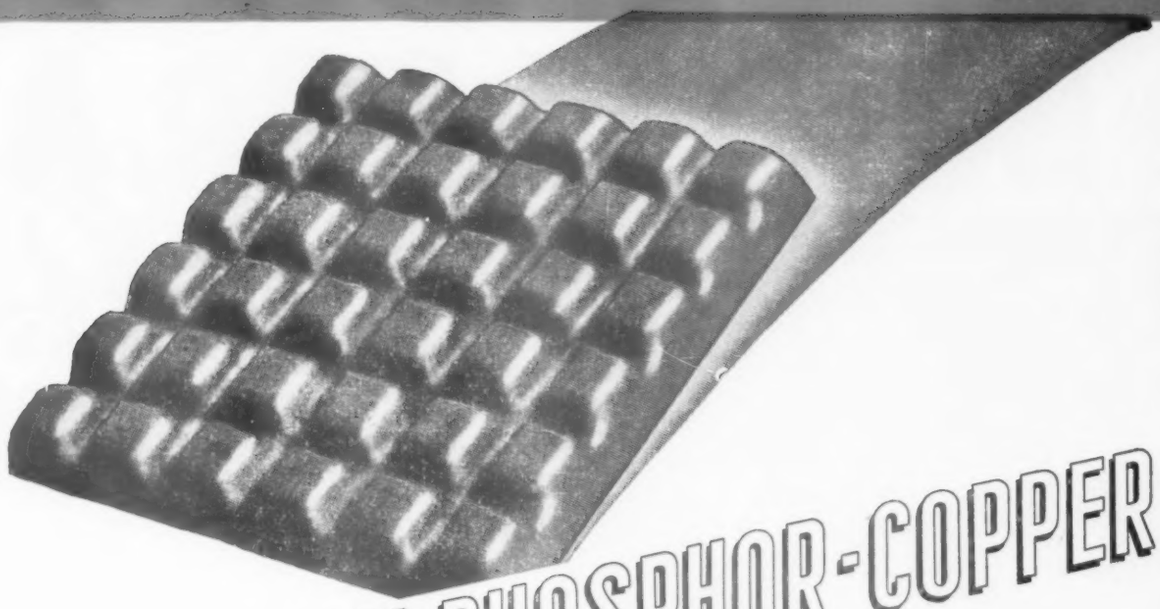
A large number of Ajax-Tama-Wyatt low frequency induction melting furnaces have been installed at this plant. The insert at the center gives a close-up of the 20 kw. holding furnace. Automatic temperature control, gentle movement of the metal (which prevents segregation) and amazingly low maintenance cost are the principal features.

AJAX ENGINEERING CORPORATION
Trenton 7, New Jersey

contain a large number of aluminum die castings which provide uniformity in size, strength and quality, and avoid excess weight. High quality of castings is contributed by exclusive use of low frequency Ajax-Tama-Wyatt induction melting furnaces.

AJAX TAMA-WYATT INDUCTION MELTING FURNACE

Associate Companies: **AJAX METAL COMPANY,** Non-Ferrous Ingot Metals and Alloys for Foundry Use
AJAX ELECTROTHERMIC CORP., Ajax-Northrup High Frequency Induction Furnaces
AJAX ELECTRIC CO., INC., The Ajax-Hultgren Electric Salt Bath Furnace
AJAX ELECTRIC FURNACE CORP., Ajax-Wyatt Induction Furnaces for Melting



THE USE OF AJAX PHOSPHOR-COPPER

Send for booklet
"INGOT METALS OF TODAY"

●

15 STANDARD ALLOYS BY AJAX

Ajax Tombasil
Ajax Plastic Bronze
Ajax Anti-Acid Bronze
Ajax Phosphor Bronze
Ajax Red Brass Ingots
Ajax Manganese Bronze
Ajax High-Tensile Manganese Bronze
Ajax Golden Glow Yellow Brass
Ajax Nickel-Copper 50-50%
Ajax Manganese Copper
Ajax Aluminum Alloys
Ajax Phosphor Copper
Ajax Silicon Copper
Ajax Nickel Alloys
Ajax Phosphor Tin

NOTE

"Proper Melting Decreases Foundry Losses," contains interesting data. Also, the booklet, "Nonferrous Ingot Metals of Today." Write for both of these. They are free.

Successful foundrymen deoxidize or "clean up" molten metal by a scientific method worth using *as indicated:*

They use phosphorus . . expertly . . in the form of "Ajax Phosphor Copper" . . added as the crucible is removed from the furnace . . for virtually all brass and bronze alloys.

In notched waffle sections, or in shot form, Ajax 15% P-Cu does its work at .01% (1 oz. per 100 lbs.). Introduced, and having time to react when stirred with a whirling motion of the skimmer, it causes oxides to rise for effective removal by skimming from the surface. It is best to avoid phosphorus build-up from back stock.* . . If you use phosphorus these days, use Ajax Phosphor Copper (useful also in producing your phosphor bronze)

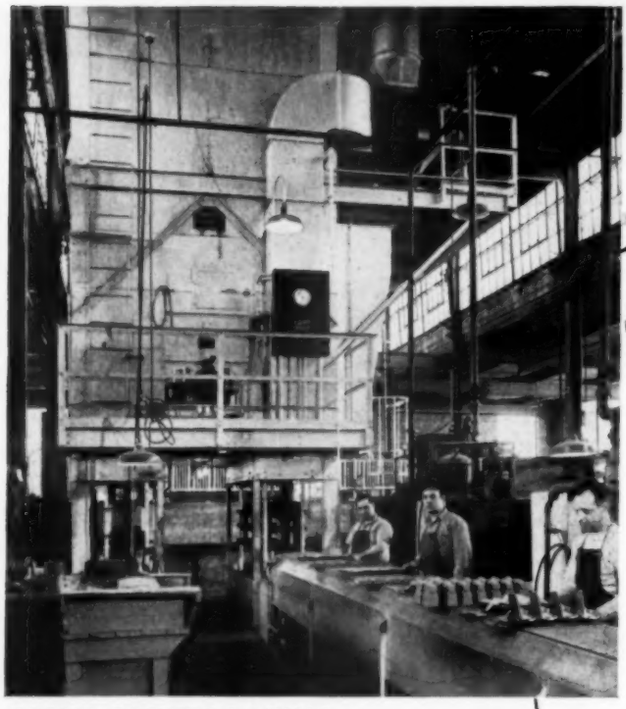
THE **AJAX METAL COMPANY**
ESTABLISHED 1880
PHILADELPHIA

ASSOCIATE COMPANIES:

AJAX ELECTRIC FURNACE CORPORATION, *Ajax-Wyatt Induction Furnaces for Melting*
AJAX ELECTROTHERMIC CORPORATION, *Ajax-Northrup Induction Furnaces for Melting, Heating*
AJAX ELECTRIC COMPANY, INC., *Electric Salt Bath Furnaces*
AJAX ENGINEERING CORPORATION, *Ajax-Tama-Wyatt Aluminum Melting Furnaces*

»BOTH LABOR AND M

Prefer CO



EASIER, FASTER LOADING. Coleman Tower Ovens have a **PATENTED OPEN CENTER** which permits loading from both inside and outside the Tower. This exclusive feature increases loading accessibility up to 300% more than other vertical oven designs.

ESTABLISHED 1890

THE NEW YORK AIR BRAKE COMPANY

WATERTOWN, NEW YORK

March 10, 1945

Mr. C. A. Barnett,
President & General Manager,
The Foundry Equipment Company,
Cleveland 13, Ohio

Dear Mr. Barnett:

In reply to your letter of March 5th we are glad to give you our general observations on the Coleman Tower Core Oven installed last year.

The Coleman Tower Oven has been in operation continuously twenty to twenty-four hours per day, seven days per week, for the past six months, which certainly proves its dependability under uninterrupted operation.

Coremakers and oven tenders prefer this equipment because of its lessened heat exposure and the fact that the cores come through the unloading position free from smoke and fumes.

We prefer the Tower oven because the resultant cores are more uniformly baked than with any other equipment we have ever used, and, hence, our spoilage is less and, our entire operation is more economical.

You may be sure we are pleased with this installation and are glad to highly recommend it.

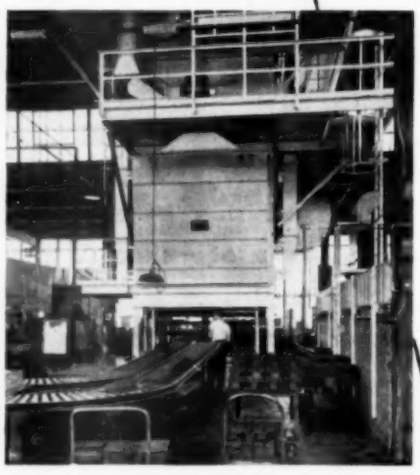
Yours truly,

H S Gulick

HSG/m

COMFORTABLE UNLOADING

Photo at right shows unloading side of Coleman Tower Oven. Before reaching unloading position cores are thoroughly cooled and "smoked-off" for immediate handling. No acrid fumes, gases or uncomfortable heat escape from oven.



WORLD'S OLDEST AND LA

COLEMAN
CORE *and* MOLD
OVENS

The FOUNDRY E
CLEVELAND 13, O

BUILDERS OF COLEMAN A

MANAGEMENT
COLEMAN TOWER OVENS

This enthusiastic report of The New York Air Brake Company is typical of the all around satisfaction that follows every Coleman Tower Oven installation.

LABOR

"Core makers and oven tenders prefer this equipment because of its lessened heat exposure and the fact that the cores come through the unloading position free from smoke and fumes."

MANAGEMENT

"We prefer the Tower oven because the resultant cores are more uniformly baked than with any other equipment we have ever used and, hence, our spoilage is less and our entire operation is more economical."

You, too, can profit by these definite Coleman Tower Oven advantages —

DEPENDABLE PERFORMANCE • IMPROVED WORKING CONDITIONS • UNIFORM RESULTS REDUCED SPOILAGE • GREATER ECONOMY

You'll get better and faster baking at greatly reduced cost.

» *Coleman Ovens are also built in all conventional and special designs to meet every possible requirement in core baking and mold drying. When you buy a Coleman Oven you profit by experience which includes 40 years of specialization in designing and building foundry ovens, and more than 9,000 successful installations.*

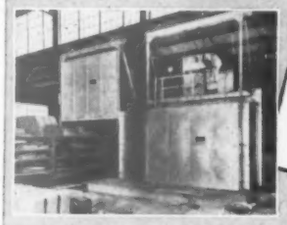
Write for Folio of Coleman Oven Bulletins

LARGEST FOUNDRY OVEN SPECIALISTS

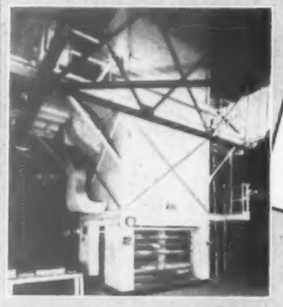
COLEMAN Portable Core Ovens

COLEMAN Rolling Drawer Ovens

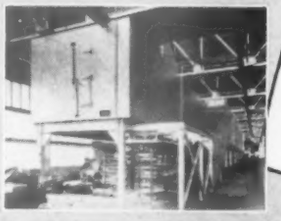
COLEMAN Transrack Ovens



COLEMAN Car Type Ovens

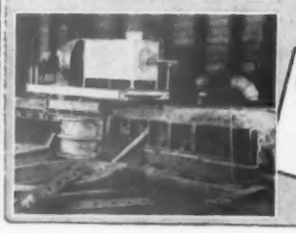


COLEMAN Tower Ovens



COLEMAN Horizontal Conveyor Ovens

COLEMAN Conveyor Mold Ovens



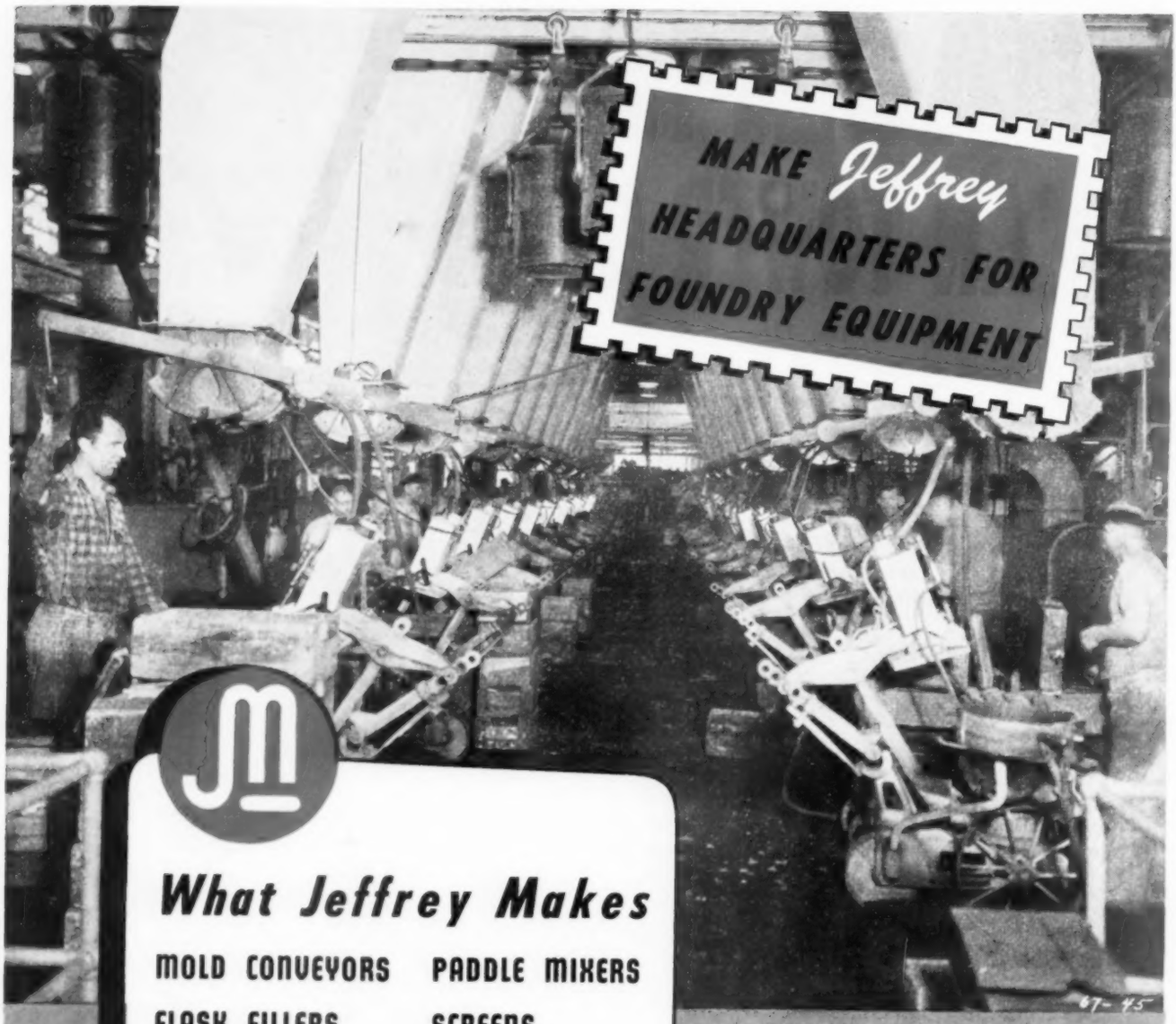
COLEMAN Portable Mold Dryers

Y EQUIPMENT Company

3, OHIO, U. S. A.

N AND SWARTWOUT OVENS

MEMBER



What Jeffrey Makes

MOLD CONVEYORS
PADDLE MIXERS
FLASK FILLERS
SCREENS
AERATORS
BIN VALVES
SANDITIONERS
CONVEYORS
BUCKET ELEVATORS

A Typical
Double-Squeezer
Molding Line

THE JEFFREY MANUFACTURING COMPANY

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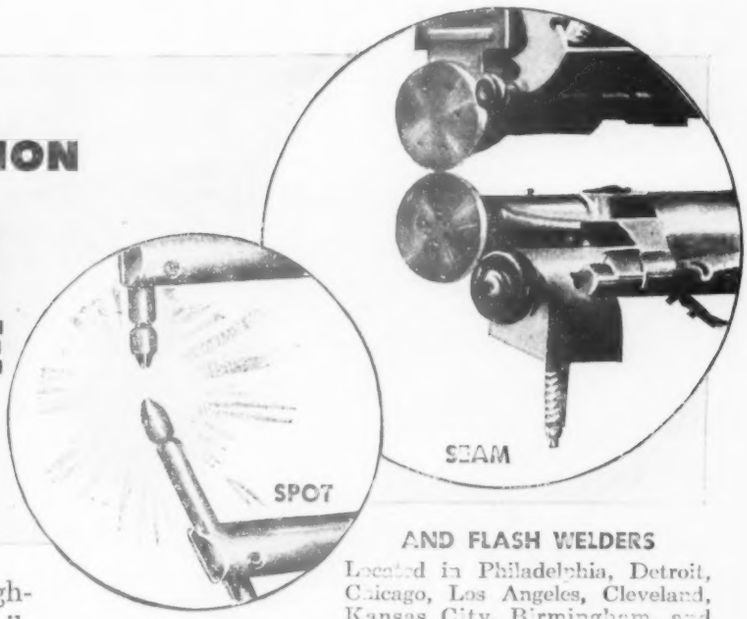
Birmingham 3 Chicago 1 Denver 2 Houston 5 New York 7 St. Louis 3
Boston 16 Cincinnati 2 Detroit 11 Huntington 19 Philadelphia 3 Salt Lake City 1
Syracuse 2

ESTABLISHED 1877

FOR HIGH PRODUCTION

SURPLUS RESISTANCE WELDERS

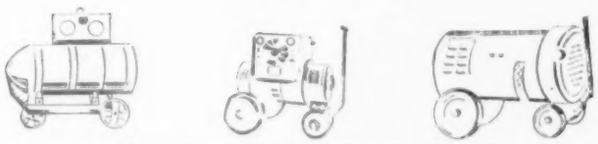


AND FLASH WELDERS

Located in Philadelphia, Detroit, Chicago, Los Angeles, Cleveland, Kansas City, Birmingham, and Boston for quick sale.

Now is the time to pick up modern high-production equipment at low cost. Available now, for early delivery are quantities of surplus spot, seam and butt flash welding machines—many unused or used for only short periods. True, much of the equipment was designed for special applications—but nearly all of it is readily adaptable to peacetime product needs—and such needs are being considered in pricing. Chances are that you can find just the equipment you need to modernize your operations or complete your new production plans. So contact your nearest War Assets Administration Regional Office today—write, wire or phone, or use the coupon below.

ALL ITEMS ARE SUBJECT TO PRIOR SALE!



LINCOLN, HOBART, AND WESTINGHOUSE ARC WELDERS
DC and AC Types; 300 to 400 amperes
DC available in large quantities.

WELD POSITIONERS
Many sizes and capacities including head and tailstock combinations.

FLAME CUTTERS
Both portable and stationary, single and multiple torch types.

VETERANS OF WORLD WAR II: To help you in purchasing surplus property, veterans' units have been established in each War Assets Administration Regional Office.

FREE FACTS TO WAR ASSETS ADMINISTRATION

Please send me information on the availability, location and condition of the following types of equipment:

- ☐ SPOT WELDERS
- ☐ SEAM WELDERS
- ☐ FLASH WELDERS
- ☐ HOBART ARC WELDERS
- ☐ WESTINGHOUSE ARC WELDERS
- ☐ WELD POSITIONERS
- ☐ LINCOLN ARC WELDERS
- ☐ ..... ARC WELDERS
- ☐ WELDING ROD OR ELECTRODES

Name.....

Firm.....

Address.....

City.....State.....

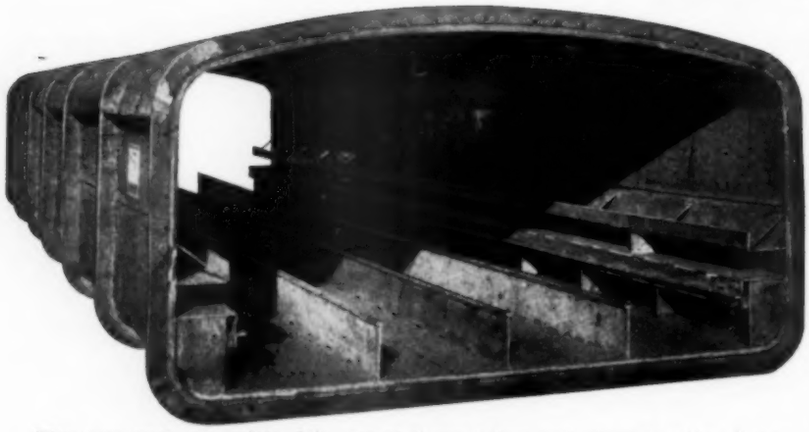
176-3

WAR ASSETS ADMINISTRATION

OFFICES LISTED BELOW ARE TEMPORARILY IN RECONSTRUCTION FINANCE CORPORATION AGENCIES

Offices located at: Atlanta · Birmingham · Boston · Charlotte · Chicago · Cleveland · Dallas · Denver Detroit · Helena · Houston · Jacksonville · Kansas City, Mo. · Little Rock · Los Angeles · Louisville Minneapolis · Nashville · New Orleans · New York · Oklahoma City · Omaha · Philadelphia Portland, Ore. · Richmond · St. Louis · Salt Lake City · San Antonio · San Francisco · Seattle · Spokane Cincinnati · Fort Worth (Telephone 3-5381)

DO YOU HAVE AN ANNEALING BOTTLE NECK?

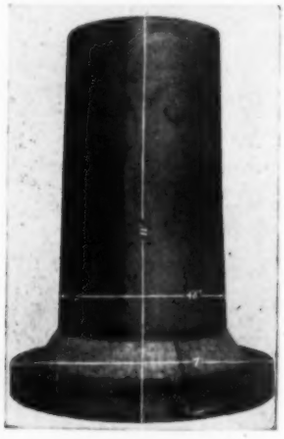


This is an inside view of the Alloy Retort shown below and gives an idea of the way in which special construction is possible to meet customer's specifications

If your Annealing Department is the bottle neck which is slowing deliveries of finished castings, it will pay you to consider the advantages of P. S. (for Pressed Steel) lightweight, welded alloy equipment.

As P. S. weighs about 65% less than heavy cast equipment, it will enable you to handle more castings per heat because it takes up less room and heats quicker.

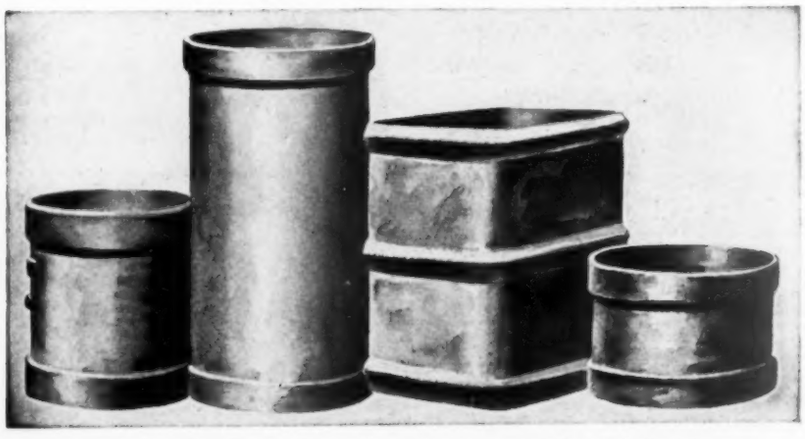
Our plant analysts will gladly make recommendations that will open up your bottle neck.



Annealing Cover made of alloy sheet steel to suit your conditions. Any size. Any shape.

This is a completed Alloy Retort recently made for a large brass manufacturer. It is 19 ft. 6 in. long, 6 ft. wide, 3 ft. high; weighs 5400 lbs.

Annealing and Heat Treating Basket 6 ft. in diameter and 6 ft. high with adjustable shelves and sides.



Carburizing Boxes, seamless drawn covers and bottoms.

THE PRESSED STEEL COMPANY

of WILKES-BARRE, PENNSYLVANIA

BRANCH OFFICES: 312 Curtis Bldg., Detroit; 503 Nicholas Bldg., Toledo; 1915 Engineers Bldg., Chicago; 51 E. 42nd St., New York; 1005 Sterling Bldg., Houston, Texas; A & M Accessories Ltd., 19 Melinda St., Toronto, Canada; Broad St. Station Bldg., Philadelphia; 417 So. Hill St., Los Angeles.

PRESSED STEEL COMPANY PRODUCTS: Carburizing and Annealing Boxes, Thermocouple Protection Tubes, Seamless Steel Cylinder Caps, Seamless Steel Neck Rings, Welded Alloy Tubing for High Temperature and Corrosive Applications, Radient Tubes, Inner Covers and Base Sheaths for Steel Mills

Proof...

THAT NI-ROD GIVES YOU STRONG, SOUND, MACHINABLE WELDS IN CAST IRON

ACTUAL STATEMENTS MADE BY WELDERS, WELDING SUPERINTENDENTS, PURCHASING AGENTS, WELDING SERVICE OPERATORS AND PLANT ENGINEERS

" ...Have never found a rod that will do what this Ni-Rod is doing..."

" ...This rod is an answer to a welder's dream..."

" ...Best cast iron welding rod we ever had."

"...I will endeavor to see that our shop is never without it ..."

"We have found that Ni-Rod allows the foundry to cut the amount of different kinds of rods used down to six."

"...Have been trying to find a satisfactory method for welding cast iron for twenty years. This is it..."

"I gave samples of this rod to some of my welders all having eight or more years of experience. All said it was the "last word" in general repair rod."

"...the best rod for cast iron we have had yet, and we have tried them all..."

"...have never found preheating necessary..."

"Ni-Rod is very good to break in new welders with -- its penetration and flexibility will not let them get into trouble."

"...Have been in business only six months and have already acquired a wonderful reputation, especially in welding cracked cylinder blocks..."

"We feel confident our business will increase 25% since we have now found a rod we can arc weld cast iron with and guarantee that the welds can be machined without any difficulty..."

NI-ROD REPAIRS CASTINGS QUICKLY... EASILY

Test Ni-Rod on your next job. Order a 5-lb. package and see how easily it gives you strong, sound, machinable welds in cast iron.

If your nearest dealer does not carry Ni-Rod, write us direct to learn where you can quickly get this new easy-handling electrode.

SEND FOR BOOKLET

INCO Ni-ROD

THE INTERNATIONAL NICKEL COMPANY, INC.
67 Wall Street
New York 5, N. Y.

DISTRIBUTED BY:

WHITEHEAD METAL PRODUCTS COMPANY, INC.—Baltimore, Boston, Buffalo, Newark, New York, Philadelphia, Syracuse

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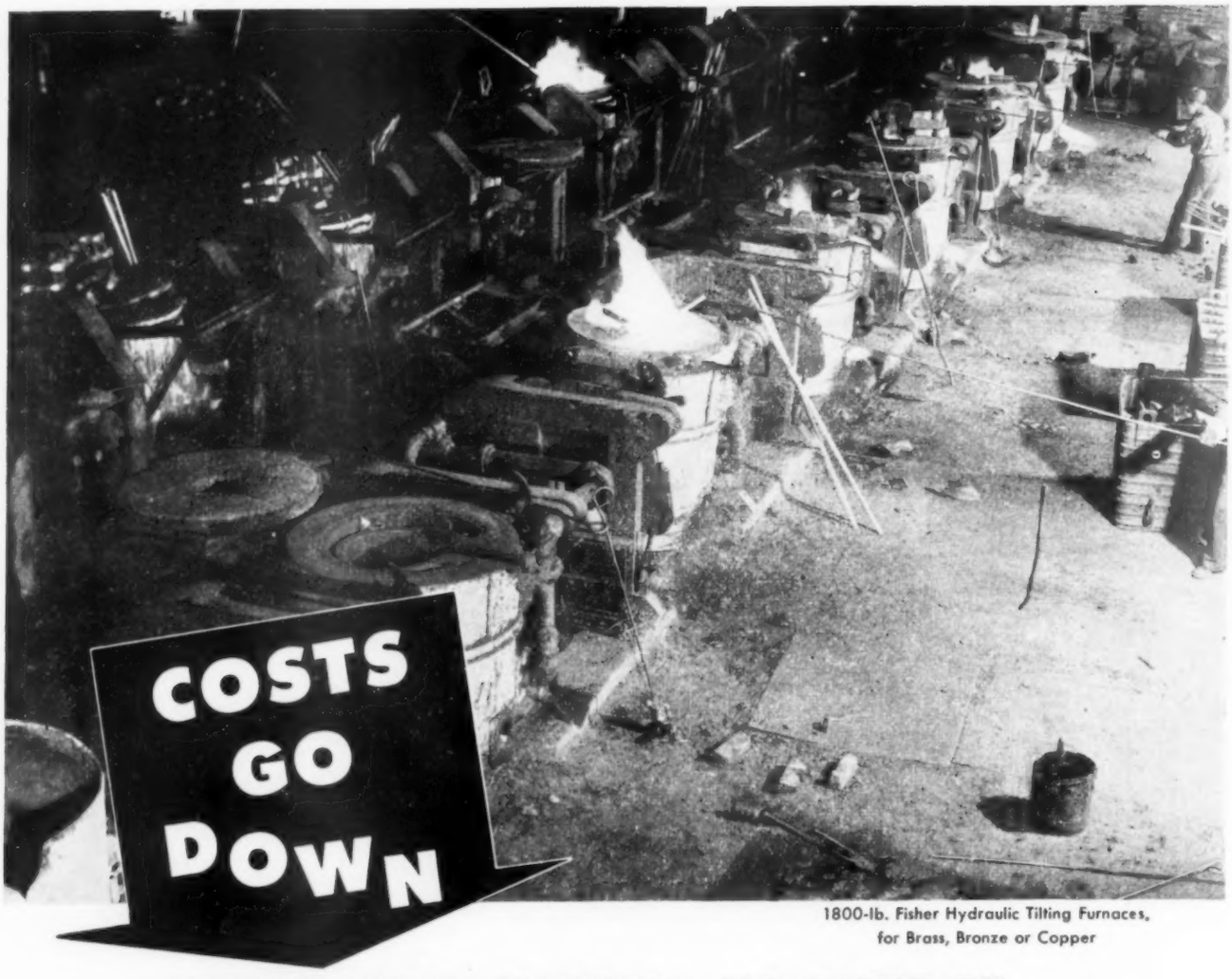


1800-lb. Fisher Hydraulic Tilting Furnaces, for Brass, Bronze or Copper

WHEN YOU INSTALL "FISHERS"

Because:

1. "Sealed-in" burners used in "Fishers" prevent excess air from eating away red hot refractories and crucibles.
2. "Fishers" provide correct melting time—producing better metal and increasing refractory life.
3. "Fishers" have long led the field in furnace development—only *foundry-proven* features are used in "Fishers."
4. "Fishers" have long employed the principle of multiple burners with appropriate mixing equipment to properly control the furnace atmosphere.
5. Quality of metal, fuel economy and labor savings are characteristic of all "Fishers"—they have been experience-engineered since 1906.

Fisher has published a well illustrated and fully descriptive Bulletin on every piece of Fisher equipment including a wide selection of all types and capacities of non-ferrous metal melting furnaces, blowers and accessories—ask for your copies.

5519 N. Wolcott Avenue, Chicago 40, Illinois

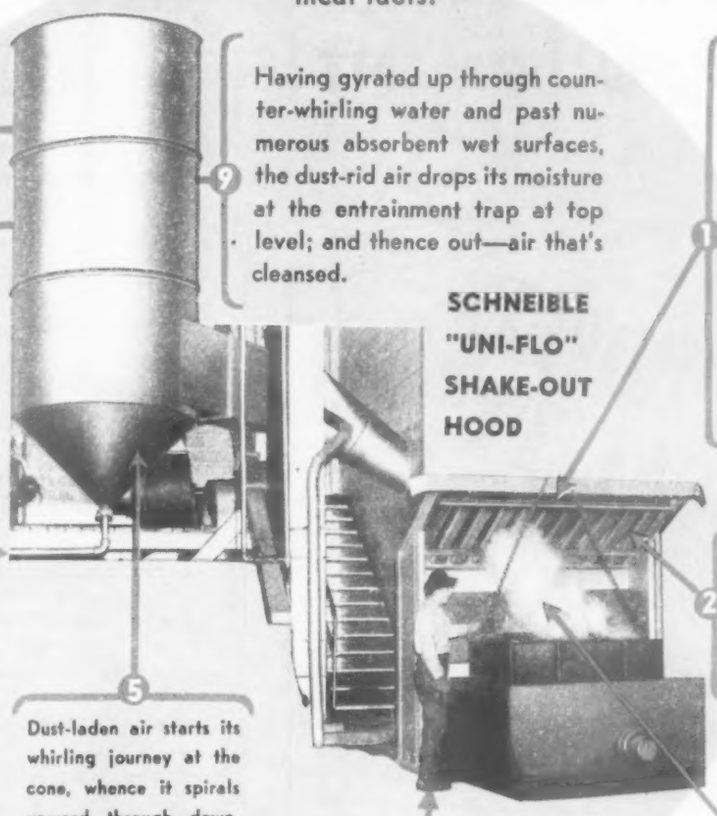
Fisher FURNACE COMPANY

Engineers and Manufacturers

Let's Get Technical— ABOUT DUST AND FUME CONTROL AT SHAKE-OUTS

(. . . many foundrymen know that Schneible knows how to "get technical" through its engineers located in principal industrial centers.)

NOW is the time to get-set-go! Desirable labor is scarce for plants with DUST trouble. Take Shake-Outs for example. Here, rapid, efficient production is wanted. The problem can be readily solved with standard Schneible units tailored to *your* set-up. Here are standout technical facts:



SCHNEIBLE "UNI-FLO" SHAKE-OUT HOOD

SCHNEIBLE MULTI-WASH SENIOR DUST COLLECTOR

1 Dust and fumes rise directly into the hood. Vehicle used is used shop air. Through duct and into collector it flows to be cleansed of dust and fumes. Shake-Out area is continuously ventilated two ways: dust-laden-air, OUT; clean air — IN.

2 Adjustable louvers in the sturdy hood regulate direction of air flow, eliminate side eddies, and compensate for shop drift.

3 Note that flow is steady and uniform, like a plume—not erratic, not too strong and not weak. The strategy of air control (modernized venturi principle) converges all currents of flow upon the Shake-Out area — on - up - in - away . . . constantly, thoroughly. Schneible's quarter century of experience lies behind this practical, controlled air flow.

4 Better employee health and efficiency — less absenteeism — an improved working morale — is the human side which pays off in more work done in less time — more foundry profits, and less foundry maintenance.

5 Dust-laden air starts its whirling journey at the cone, whence it spirals upward through downward spiralling cascades of water and against multiple tiers of impingement surfaces. All action is interplay among air, water and angled planes—no moving parts, no dry surfaces.

6 Leading away to the outside is the sludge drainpipe—either to a simple fill or to Schneible Settling and Dewatering Tank with or without Pump depending on the setup. Required rate of sludge removal from tanks varies with the size and type of plant. Schneible engineers know how to prescribe for your situation and problem.

7 Clean water inlet — water is introduced at no head pressure, no nozzles, no maintained water level.

8 Clean air outlet, with fan on the clean air side—*the only moving part in the system.*

9 Having gyrated up through counter-whirling water and past numerous absorbent wet surfaces, the dust-rid air drops its moisture at the entrainment trap at top level; and thence out—air that's cleansed.

Read Full Story in Our Bulletins — Write to:

CLAUDE B. SCHNEIBLE COMPANY
2827 Twenty-Fifth St., Detroit, Mich.
Offices in Principal Cities

MANUFACTURER'S ASSOCIATION INC. FOUNDRY EQUIPMENT

SCHNEIBLE

LIQUID-VAPOR INTIMATE CONTACT EQUIPMENT for DUST COLLECTION ABSORPTION CONDENSATION AND TEMPERATURE REDUCTION

One of the Many Advantages

of GAS and MODERN GAS EQUIPMENT

Competitively, better products at no increase in cost—or with possible price reductions—should put any manufacturer in an advantageous position. One tool in modern production that has helped many manufacturers attain this envious goal is Gas—the production line fuel for every type of industrial heat treating.

There are many case histories which prove that when manufacturers switch to Gas and modern Gas equipment they turn out better products, at greatly reduced cost, with considerable improvement in cleanliness, working conditions and other desirable objectives.

Clean, economical, fast, accurately and easily controllable, dependable, efficient, uniform at all times, requiring no capital investment in bunker or tank storage, Gas is truly the fuel of today.

To secure the advantages of this modern fuel for utmost quality of product and profitable manufacture, consult the Industrial Engineer of your local Gas Company. His services are available, for your benefit, with no obligation.

THE TREND IS TO GAS
FOR ALL INDUSTRIAL HEATING

AMERICAN GAS ASSOCIATION
420 LEXINGTON AVENUE, NEW YORK 17, N.Y.

Federated — MODERN HEADQUARTERS FOR NON-FERROUS METALS

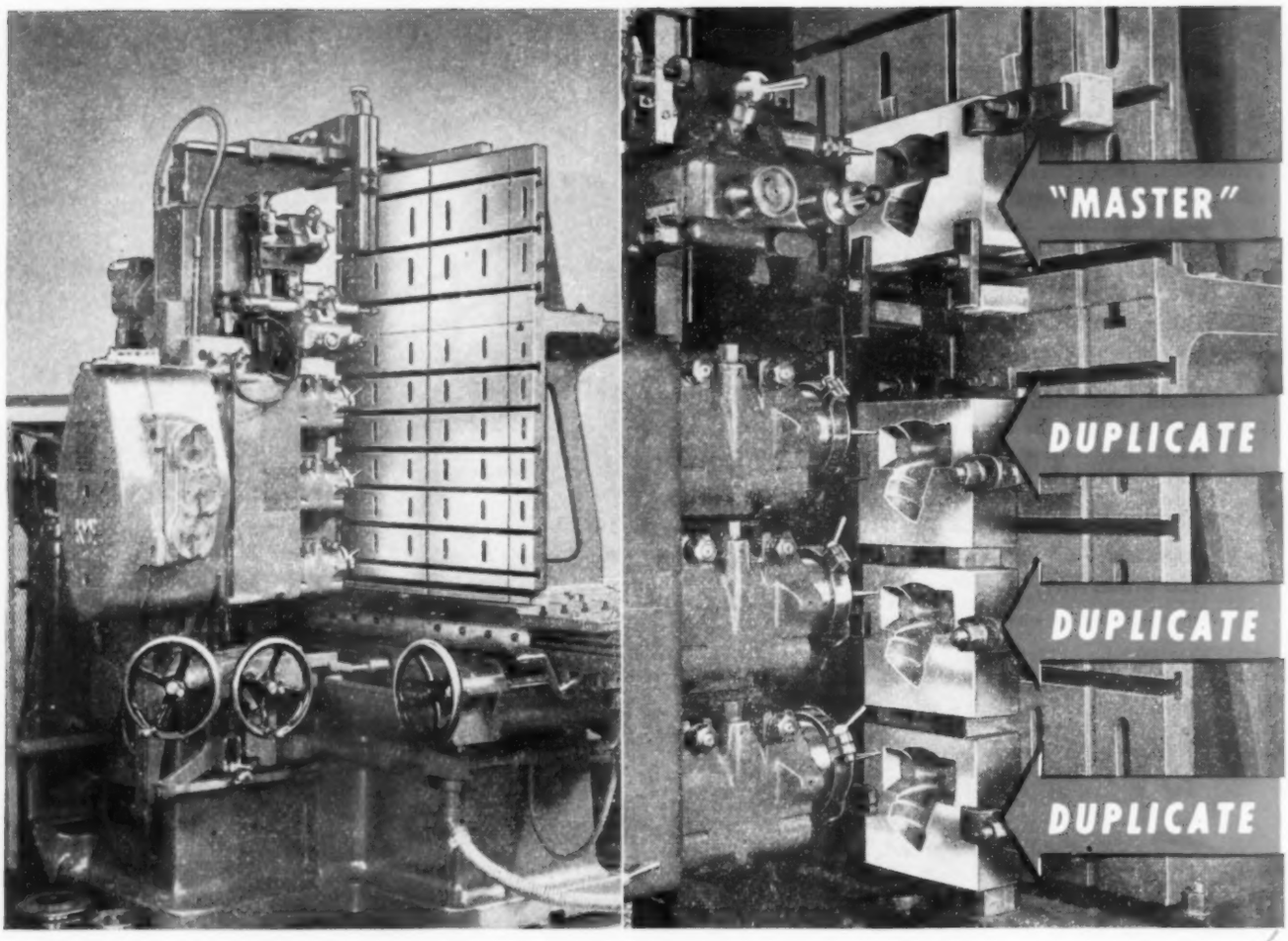
PREPARATION—Success in modern smelting is based upon the use of scientific engineering principles. In Federated, these principles are utilized in the segregation and preparation of incoming materials. Sub-standard metals and foreign substances are eliminated and economic and metallurgical classifications are made. To accomplish this job, mechanical, electrical, chemical, spectroscopic, or colorimetric methods are used. This insures a quality product right from the start. Illustrated below is a modern installation, designed by our engineering department, used for the removal of oil, moisture, free iron, and other foreign material from aluminum borings.

FEDERATED METALS DIVISION
American Smelting and Refining Company
120 Broadway, New York 5, N. Y.

Nation-wide service with offices in principal cities

FMD Federated

ALUMINUM · BRASS · BRONZE · BABBITT · DIE CASTING ALLOYS · SOLDER · TYPE METAL · ZINC DUST



Service Now Available

KELLER MACHINE AND PATTERN WORK

HOWARD modern facilities include two 3-spindle, automatic-type Pratt & Whitney Keller Machines which are now available for immediate service on all types of metal duplicating work.

Other **HOWARD** facilities include wood and metal production patterns, brass, bronze and gray-iron castings.

At **HOWARD**, you will find the highest type of skilled craftsmen and modern equipment — a combination that assures you of patterns and castings that are precision-engineered to fit your individual foundry requirements. Your inquiry is invited.

☞ No Pattern too Large or Small for our Consideration

HOWARD FOUNDRY CO.
Pattern Division
1700 N. KOSTNER AVE. CHICAGO 39, ILL.

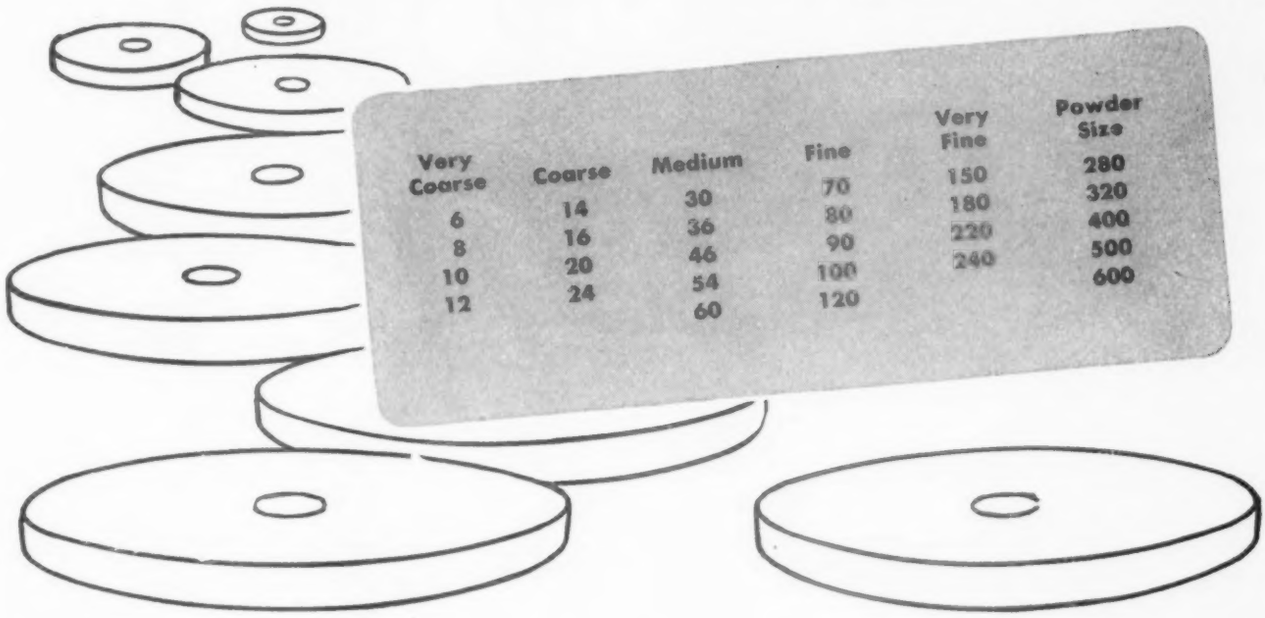
ARMY NAVY

HOWARD

ALUMINUM BRASS BRONZE MAGNESIUM SEMI-STEEL

PATTERNS

How do you tell which grit to use?



Listed is a commercial classification of standard abrasive grit sizes. They come in a wide range... from 6 classified as very coarse to 600 classified as powder size. And, the variety is further extended by special sizes and combinations. Yet, each one is designed to do a specific job better than any of the rest.

To complicate correct choice even more, there is a long list of variable factors to consider. Among these, you'll find wheel speed, machine condition, specified tolerances, material analysis, related production schedules, and a host of others.

The correct selection hinges on the review which is given to all the controlling factors. Yet...grinding efficiency and economy depend on the right answer.

That's why the Carborundum Company has put together a practical program... a service now deemed essential by many concerns who have been successful in getting improved grinding in terms of better finishes, or at lower cost.

Your nearest contact to this service is a CARBORUNDUM representative You'll find him willing and helpful. Through a sound knowledge of abrasives and first-hand experience of their use and application in the many plants he contacts, he is able to make intelligent recommendations and suggestions. On the more uncommon problems, he can even call on our Abrasive Engineers who are more fully qualified to tackle the tough problems. And, sometimes, the answer comes from the modern laboratories at CARBORUNDUM—where scientists and technicians probe for new information on abrasives, practices and developments.

Here is a sound approach—not only to getting the right grit—but the right combination of grit, bond, grade, structure and all the other parts that make up a grinding wheel. *Plus* knowledge and experience invaluable in modern grinding methods and procedures. It's easy to use. It incurs no obligation. It makes sense. The Carborundum Company, Niagara Falls, New York.

A good rule for good grinding... **CALL IN**

CARBORUNDUM

TRADE | MARK

BONDED ABRASIVES

WHEELS
- Silicon Carbide
- Aluminum Oxide
- Diamond

Cylinder Hones
Sticks, Stones & Rubs
Specialties

COATED ABRASIVES

Paper, Cloth and Combination
Sheets, Rolls, Discs

ABRASIVE GRAINS AND COMPOUNDS

for:
- Polishing
- Lapping
- Pressure Blasting
- Finishing

"Carborundum" is a registered trademark which indicates manufacture by The Carborundum Company

...When Magnaflux* Points It Out

Actually, this is the picture of an *invisible* shrinkage crack in a gray cast iron generator housing—*as revealed by Magnaflux.* Beyond question, the part is defective. If assembled, trouble is sure to develop—later—when the whole generator would have to be torn down. Yet, in the old days, any inspector or foreman could have been forgiven for allowing this casting to leave the foundry.

With Magnaflux—it's easy to cull out such sub-standard parts and to analyze and correct the causes of defects. Every piece, or part, can be examined in the foundry for scabs, blow holes, porosity and shrinkage or surface cracks. All surface, and many sub-surface flaws, are pointed out by surface indications.

Why not look into the possibilities of Magnaflux, as applied to your business? It offers practical advantages in meeting more competitive business conditions. Thorough inspection pays out in protecting customer good-will. Just write us that we may send an explanatory bulletin.

**Magnaflux, Registered U. S. Patent Office, a trade mark of Magnaflux Corporation applied to its equipment and materials for magnetic particle inspection.*

MAGNAFLUX CORPORATION

MAGNAFLUX CORPORATION
5918 Northwest Highway, Chicago 31, Illinois
NEW YORK • DETROIT • DALLAS • LOS ANGELES • CLEVELAND • BIRMINGHAM

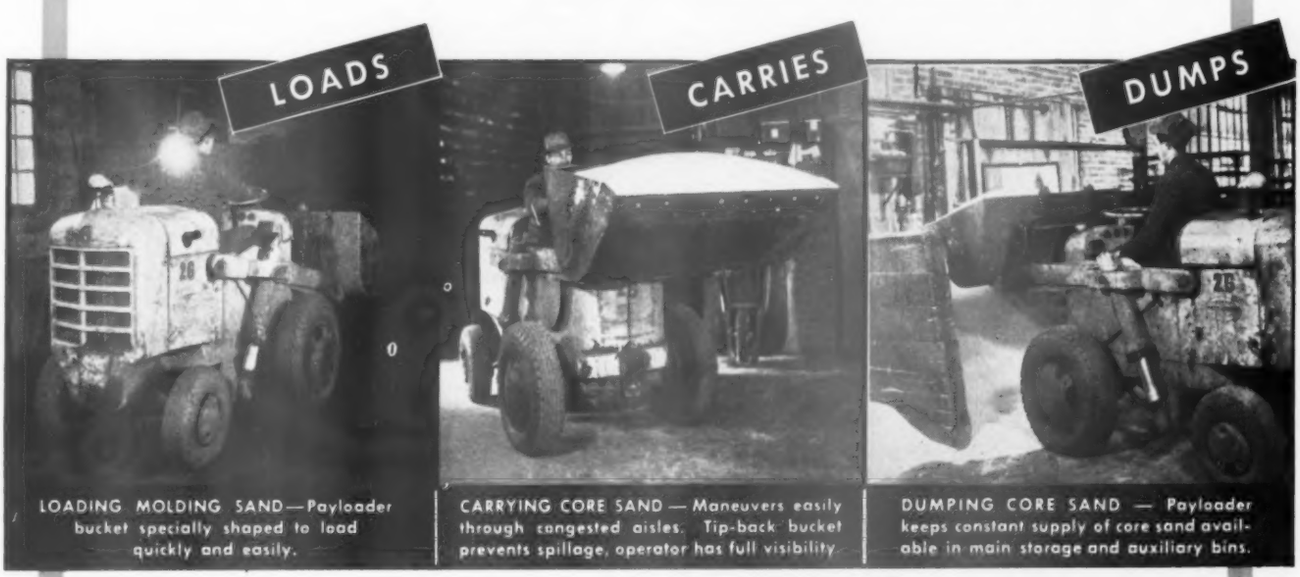
Saves LABOR
Cuts COSTS
Increases PRODUCTION

HOUGH
Payloader

- **Bucket capacity—10½ cu. ft.**
- **Large Easy Rolling Wheels**
- **Powerful Safety Brakes**
- **Full Visibility**
- **Tip Back Bucket**

Hough Payloaders pay their way every day handling moulding and core sand, in foundries throughout the country. Fast, versatile and powerful, they replace wheelbarrow crews, cut labor costs and keep a steady supply of sand available for maximum daily tonnage.

The HA Payloader is small and compact, fits in tight spots—in railroad cars, storage bins—narrow aisles and congested areas. Easily operated, sturdily constructed, built for severe service. Handles slag—bulk materials—snow—general cleanup. Lift fork available for handling castings. Write for complete details today.



LOADING MOLDING SAND—Payloader bucket specially shaped to load quickly and easily.

CARRYING CORE SAND — Maneuvers easily through congested aisles. Tip-back bucket prevents spillage, operator has full visibility.

DUMPING CORE SAND — Payloader keeps constant supply of core sand available in main storage and auxiliary bins.

THE FRANK G. HOUGH CO.

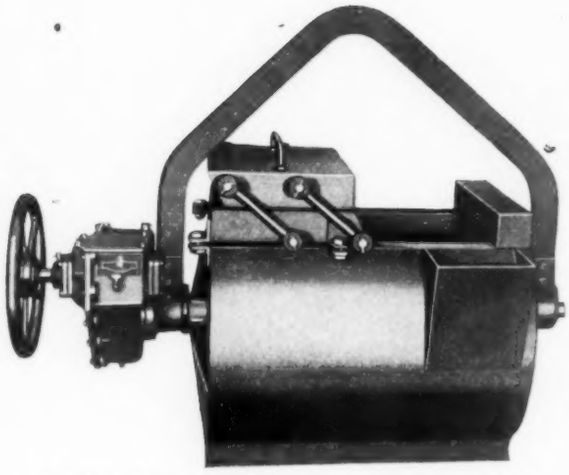
MATERIAL HANDLING EQUIPMENT
LIBERTYVILLE, ILL.

LADLES

For Handling

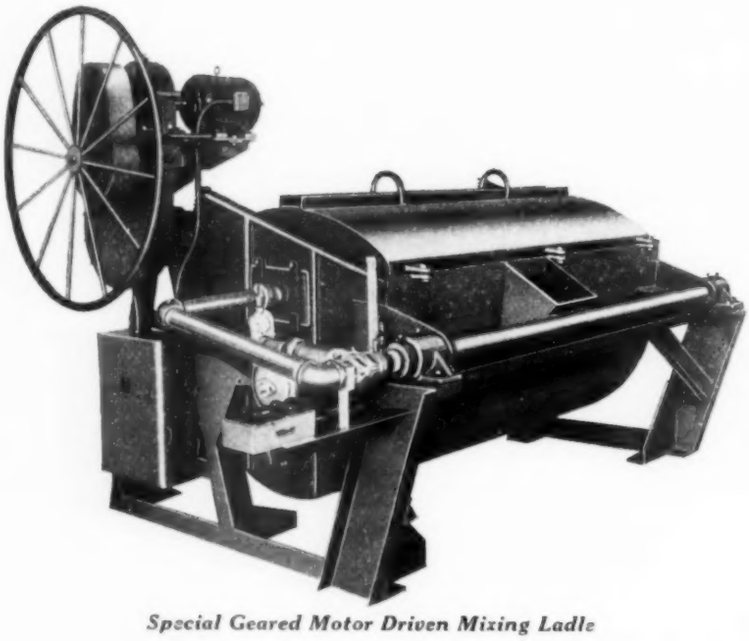
and Pouring

All Metals



Cylindrical Insulated Covered Geared Crane Ladle

ALL CAPACITIES



Special Geared Motor Driven Mixing Ladle

TIMKEN WORM GEARED LADLES

These patented ladles are designed by men with over 30 years of practical foundry experience.

They offer the utmost in Safety, Dependability, Long Life, Ease of Operation, Convenience, Economy and Simplicity.

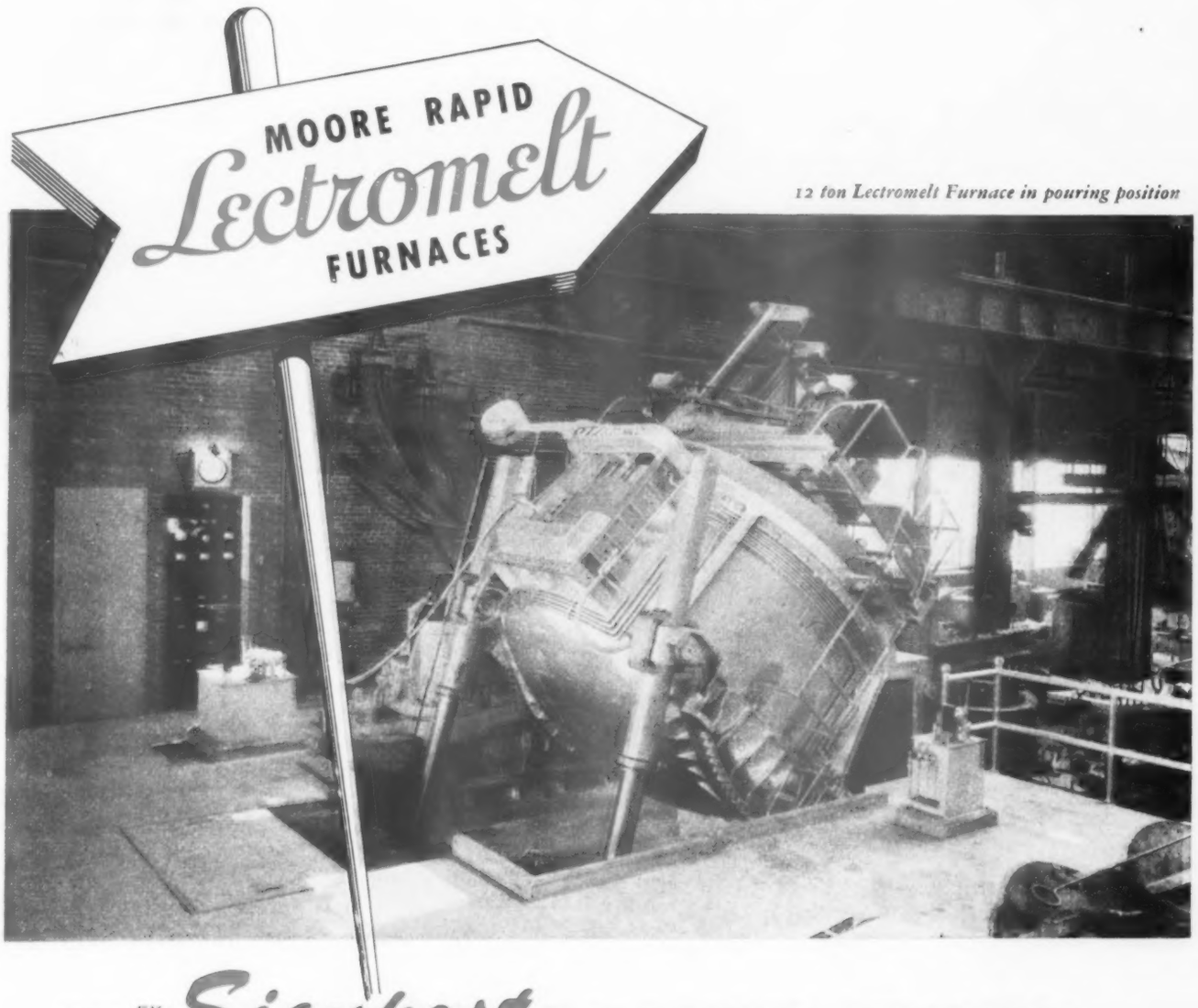
They are manufactured in all types and sizes, and can be furnished for manual or electrical operation.

Geared Crane Ladle

Our line of pouring and handling equipment is complete, including bowls, shanks, bails and tongs . . . special equipment.

INDUSTRIAL EQUIPMENT CO.

115 NORTH OHIO STREET **MINSTER, OHIO**



12 ton Lectromelt Furnace in pouring position

THE *Signpost* TO BETTER MELTING...

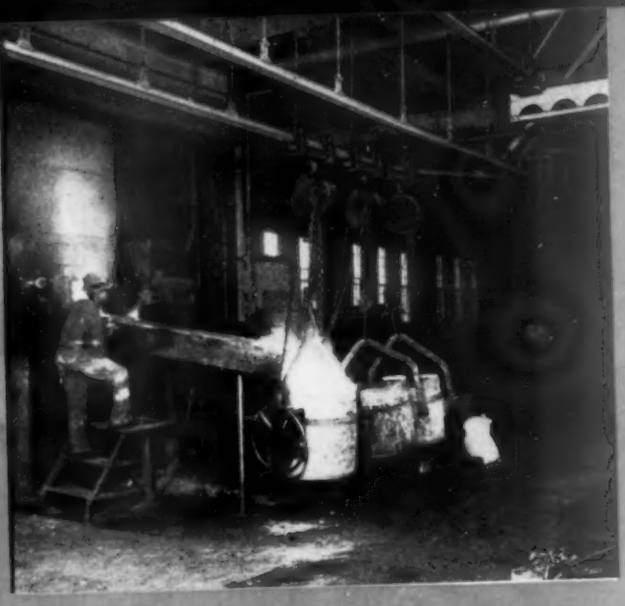
Precision control, in the melting operation, is the secret of Lectromelt's superior metal melting. Large or small heats may be melted as desired or part of a heat may be tapped with the remainder altered to suit requirements. This ability to change the analysis during the operation allows for close quality control, even of small quantities, with economy of metal.

The Lectromelt patented counterbalanced electro-mechanical arms permit accurate regulation of the electrodes, resulting in further economies and the production of higher grade metals. Write today for full information.

Lectromelt top charge furnaces are available in capacities from 100 tons to 250 pounds.

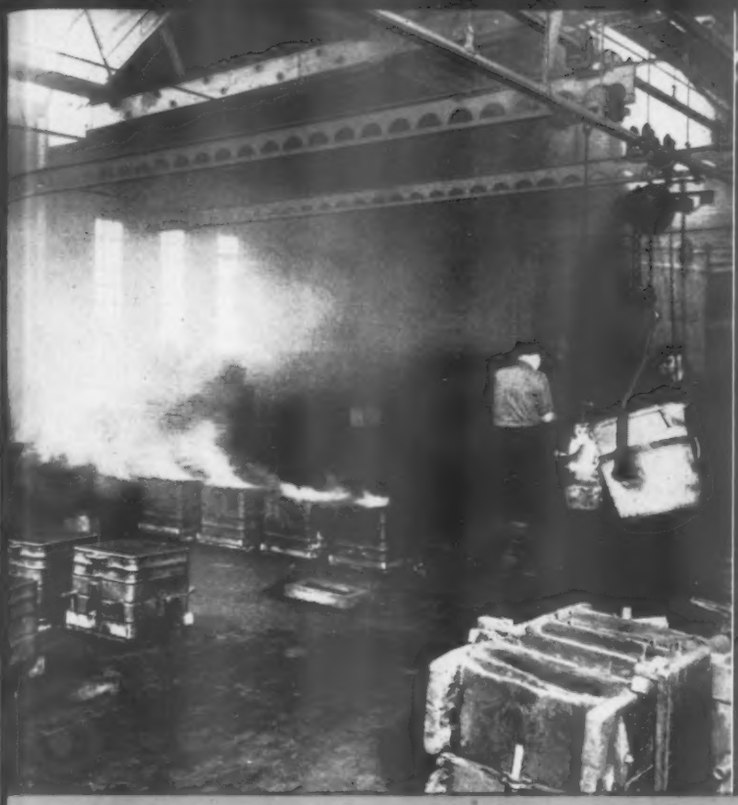
PITTSBURGH LECTROMELT FURNACE CORP.

PITTSBURGH 30, PENNA.



...PRODUCTION

A VITAL WORD SYNONYMOUS WITH CLEVELAND TRAMRAIL



CLEVELAND TRAMRAIL SPEEDS FOUNDRY PRODUCTION

Today one of the most vital words in the dictionary is PRODUCTION. Every device conceivable is being considered or adopted that will aid the output of a plant. This holds true in foundries. Castings of every kind are needed badly.

When one considers that from 25 to 100 tons of materials (such as sand, flasks, molds, cores, pig iron, scrap, molten iron, rough castings) are handled to produce one ton of finished castings, the importance of the labor and time required for handling is more fully appreciated. Indeed, one of the most important ways of stepping up production in a foundry is through use of equipment that will facilitate handling.

In hundreds of foundries Cleveland Tramrail has eliminated a vast amount of unnecessary rehandling and greatly reduced manual drudgery. Because of this modern overhead materials handling equipment many more tons of castings are being produced with the same facilities and labor.

GET THIS BOOK!

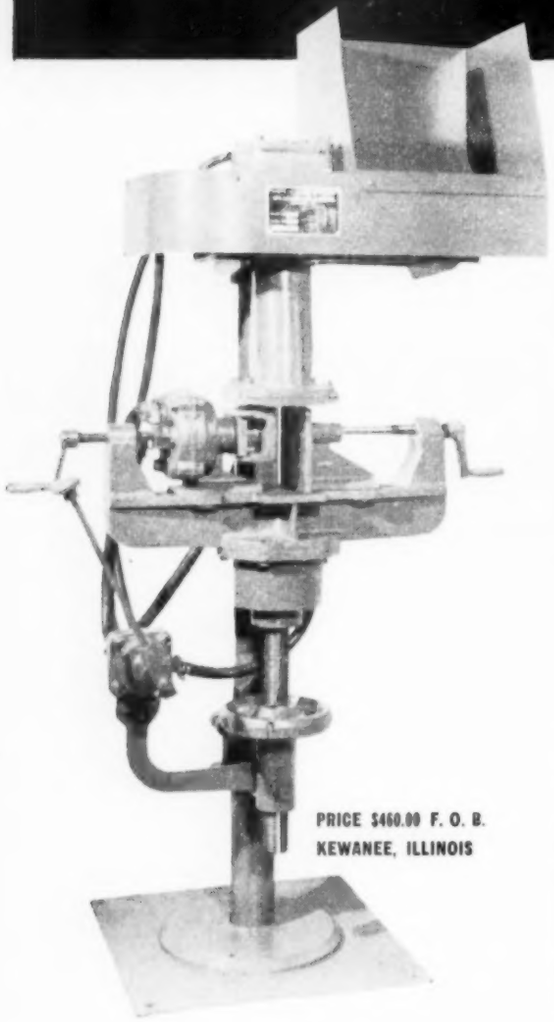
BOOKLET No. 2008. Packed with valuable information. Profusely illustrated. Write for free copy.

CLEVELAND TRAMRAIL DIVISION
THE CLEVELAND CRANE & ENGINEERING CO.
1155 EAST 283RD ST. WICKLIFFE, OHIO.

CLEVELAND TRAMRAIL

OVERHEAD MATERIALS HANDLING EQUIPMENT

Announcing the DEMMLER NO. 50



PRICE $460.00 F. O. B.
KEWANEE, ILLINOIS

THE SMALL, LOW COST CORE BLOWER YOU'VE BEEN WAITING FOR

Here at last is the answer to the rapid and profitable production of small, high quality cores. It's especially adapted to short run jobs because of its quick, easy adjustments. The Demmler No. 50 is a low cost dependable machine capable of blowing 200 cores an hour—every hour—with characteristic Demmler high efficiency. The Demmler No. 50 is not a gadget—it's a complete machine equipped with both vertical and horizontal automatically operated air clamps. In fact, most of the important features of larger Demmler models are found on this reasonably priced machine.

By means of a single hand valve, the core box is clamped and the core blown in but three seconds!

The No. 50 will blow cores up to three pounds in weight.

The height of the table is adjustable from 30 to 36 inches— a comfortable working height. Connect the No. 50 to an air hose and the machine is ready to use.

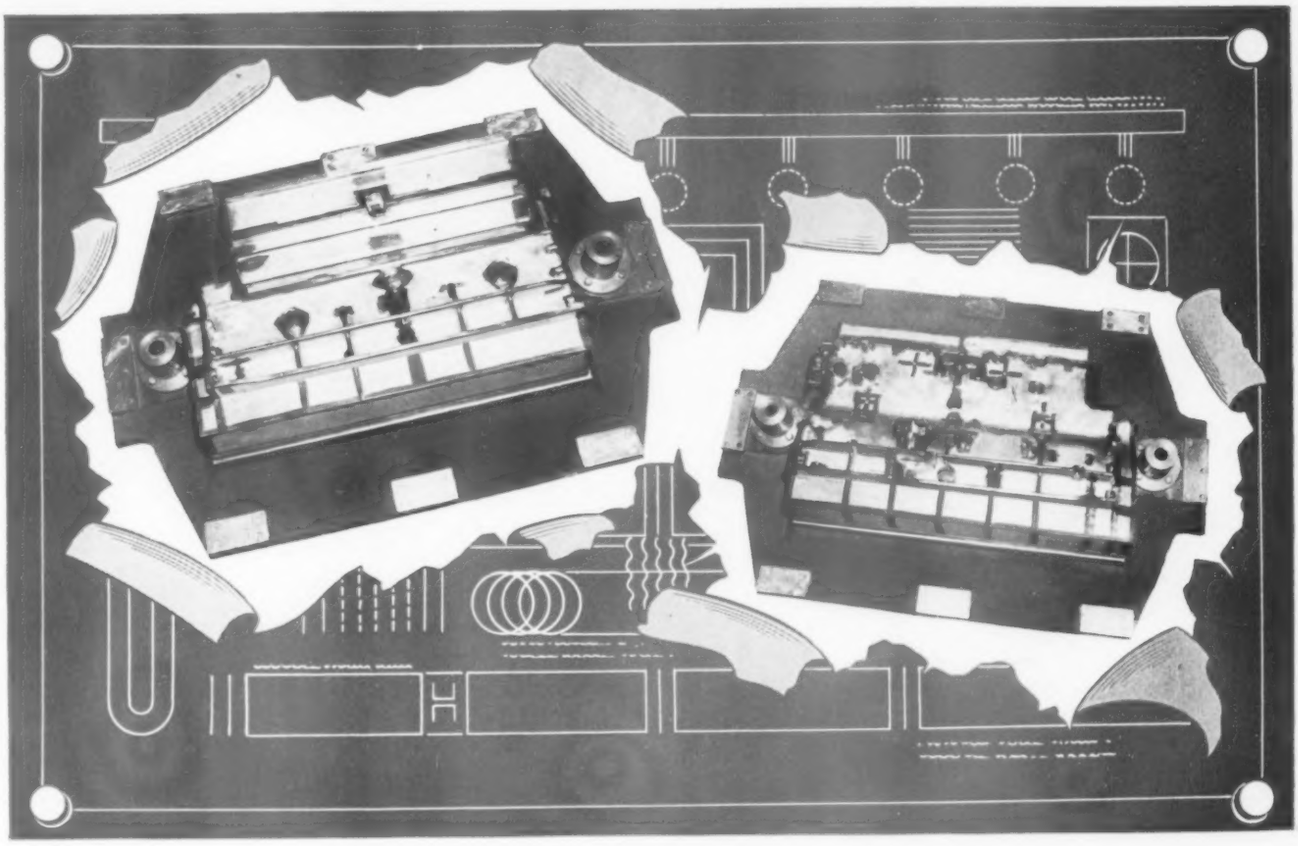
You'll be as proud of your investment ten years hence as you are today!

WRITE FOR FOLDER

MANUFACTURERS OF CORE BLOWING EQUIPMENT EXCLUSIVELY **SINCE 1911**

Wm. DEMMLER & Bros
Kewanee, Illinois

ANOTHER *Buffalo* PRECISION PATTERN



This *1947* Six Cylinder Block Just Completed For A Leading Automobile Manufacturer

The above patterns are brass machined all over, mounted on meehanite stool plates, photographed just before being shipped. Here is another fine example of "Buffalo's" ability to serve the most intricate pattern requirements of leading manufacturers. The big reason behind "Buffalo's" more than fifty years of success in precision pattern making is a complete knowledge of metals, structural design and practical fabrication. We invite you to consult "Buffalo" to have your next pattern "Precision Made".

BUFFALO PATTERN WORKS

830 HERTEL AVENUE • BUFFALO 16, NEW YORK

The trend is toward

HIGHER COMBUSTION TEMPERATURES

● **LECO COMBUSTION BOATS**

have been designed to withstand temperatures up to 2700° Fahrenheit.

In addition they give you these features:

- Fast preheating because of light weight.
- Resist heat shock to permit reuse of the boat for repeated combustions.
- Sulphur free.
- Carbon free, except as contaminated from handling.

● **VERY LOW COST**

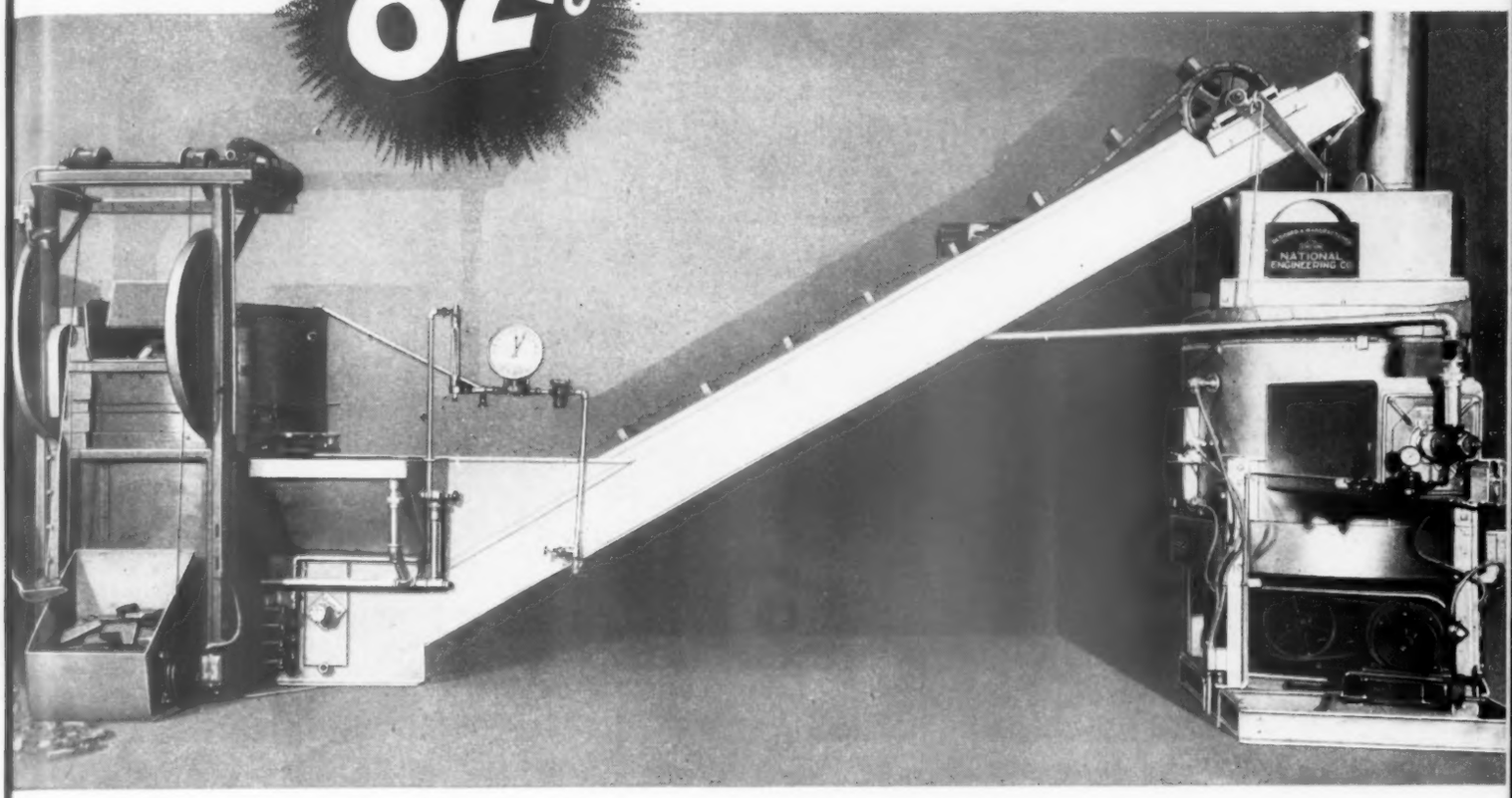
There is a Leco Combustion Boat to suit your every requirement. Large stocks of standard shapes and sizes are maintained to assure immediate delivery. Special shapes may be furnished upon request.

Compare the Leco boat with any other on the market. We will furnish you free samples for this purpose.

LABORATORY EQUIPMENT CORPORATION

BENTON HARBOR, MICHIGAN

SAVE 82% OF YOUR WASTE SAND!



NATIONAL *Sand Recovery System*

The system which combines the 2 steps necessary for the successful recovery of foundry sand—1, Wet scrubbing—2, Furnace ignition.

The National Sand Recovery System has been developed for small and medium foundries—to help them effect important cost reductions through the re-use of molding and core sands. The National is a 2-stage system, wet scrubbing and furnace ignition, both stages of which are necessary for the complete cleaning of molding sand. As core sand requires ignition only, the National Ignition Furnace is available separately.

There is a bulletin giving details of the New National Sand Recovery System, write for it today—and plan to install a National for the operating economy you will need tomorrow.

Above: Actual photograph of molding sand cleaned in the National Sand Recovery System. *Left* is the black used sand; *center* is sand after washing; *right* is sand after washing and ignition. The cleaned sand is as good as new sand—or sometimes better. Core sand, not containing clay or binder, needs only furnace ignition. Experience has proved that from 85% to 97% of used sand may be recovered by the National System.

OPERATION

In the first stage the clay bonded sand is thoroughly scrubbed with about 15% water in a Simpson Intensive Mixer to soften and separate the coating from the sand grain. Then sand is discharged into a desilting tank which carries off the fines and silt. Wet sand is conveyed to the Ignition Furnace which removes all remaining carbonaceous material. The Furnace is of rotary hearth type with a batch-holding hopper, capable of producing up to 2 tons of recovered sand per hour.

NATIONAL ENGINEERING COMPANY

MACHINERY HALL BUILDING • CHICAGO 6, ILLINOIS

MANUFACTURER'S ASSOCIATION, INC. FOUNDRY EQUIPMENT

Manufacturers and Selling Agents for Continental European Countries — The George Fischer Steel & Iron Works, Schaffhausen, Switzerland. For the British Possessions, Excluding Canada and Australia — August's Limited, Halifax, England. For Canada — Dominion Engineering Co., Ltd., Montreal, Canada. For Australia and New Zealand — Gibson, Battle & Co., Pty., Ltd., Sydney, Australia

DENVER FOUNDRY BREAKS THAT CLEANING ROOM BOTTLE-NECK

Cleaning and chipping were the cause of a chronic headache at General Iron Works Company, Denver, Colorado—until Hydro-Blast was installed.

now—

- **approximately 15 tons of iron a day go through Hydro-Blast**
- **chipping is on a day-to-day basis—no bottle-neck!—with a big saving of man-hours**
- **no more dust in the cleaning room**

Any foundry—pouring iron, steel, non-ferrous—can wisely investigate the extraordinary money-saving advantages of Hydro-Blast, by consulting with Hydro-Blast engineers. There's no obligation.

with

HYDRO-

2550 NORTH WESTERN AVE.

BLAST CORPORATION

CHICAGO 47, ILLINOIS

DILL, Inc.
RUSHVILLE, INDIANA.

... GOES ALL OUT FOR DIAMOND

Originators of
SNAP FLASKS

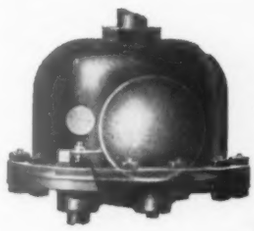
HERE in their new modern daylight foundry they find Diamond Flask Molding Equipment giving them uninterrupted production of fine gray iron castings.

This is typical of a host of other foundries using Diamond Flask Equipment for the past 57 years.

DIAMOND
CLAMP AND FLASK COMPANY

Telephone 2553 — Richmond, Indiana

Designers of CORE PLATES, JACKETS, BANDS, FLASKS *since 1889*

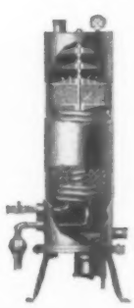


MURPHY PRODUCTS BANISH MOISTURE FROM COMPRESSED AIR

Compressed air is hot air.
Hot air carries moisture.
Moisture fouls tools,
corrodes pipes,
freezes,
reduces efficiency.

MURPHY PRODUCTS BANISH MOISTURE
from compressed air lines
or money refunded.
Investigate
these

STAR PERFORMERS
No job too large.
None too small.
Write for literature.
State your problem.
You will receive our prompt attention.

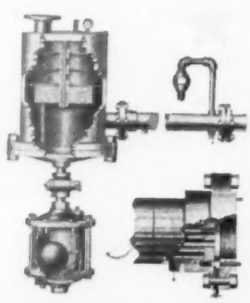


GUARANTEED COMPRESSED AIR PRODUCTS

AFTERCOOLERS • SEPARATORS • STRAINERS • TRAPS
SPRAY GUNS • PISTOL SPRAYERS

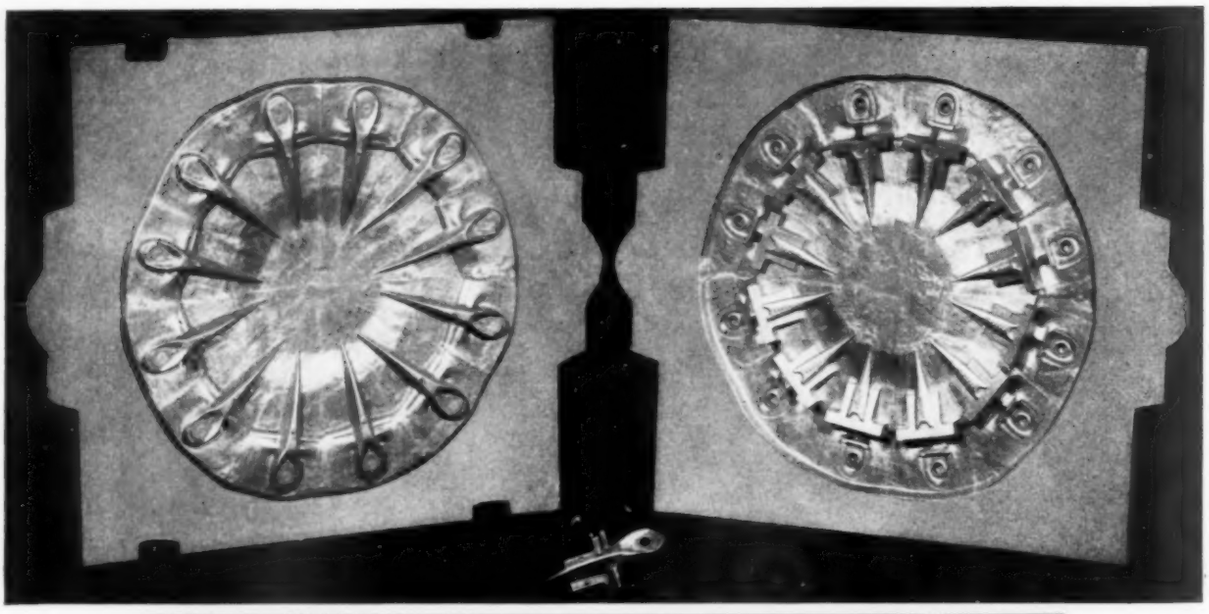
JAS. A. MURPHY & CO.
HAMILTON, OHIO, U.S.A.
Moisture Elimination Up To 3000 Pounds Per Square Inch

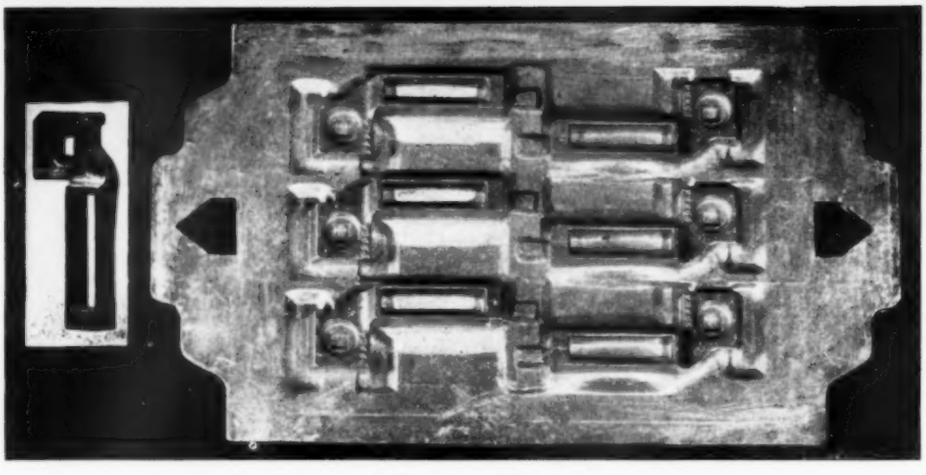
SPRAY GUNS
AND PISTOL SPRAYERS TOO!



FOUNDRYMEN:

At this critical time, with labor and material costs mounting, PRESSURE CAST MATCH PLATES and COPE & DRAG PLATES are the solution to lower production costs.





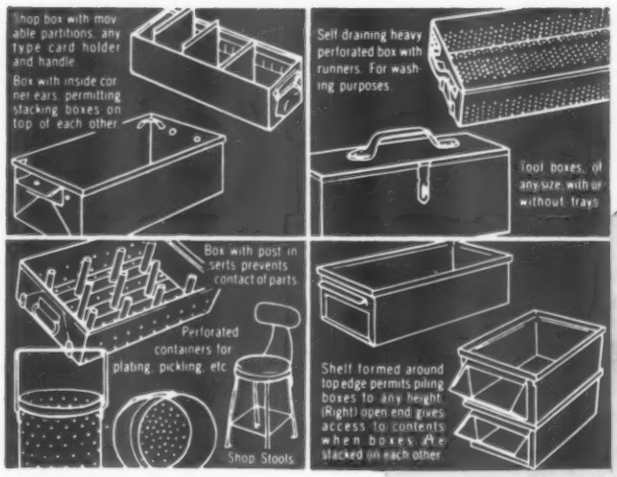
SINGLE OR MULTIPLE PATTERN MATCH PLATES CAST UNDER PRESSURE IN PLASTER MOLDS

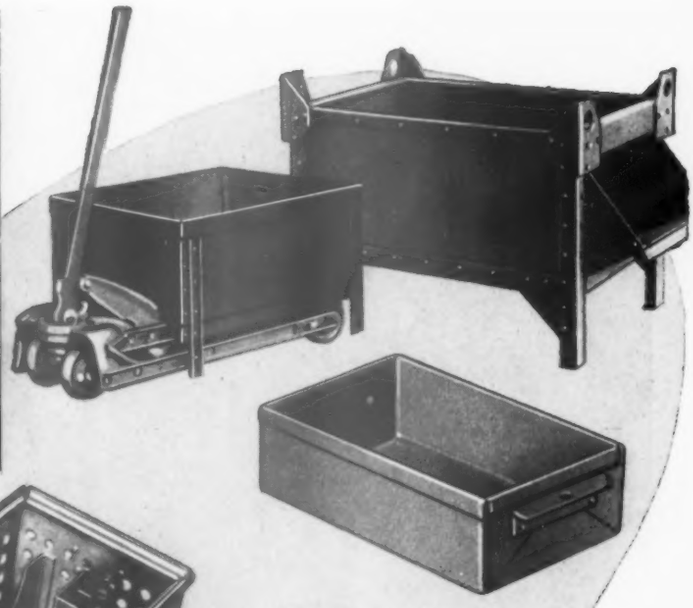
BY

PLASTER PROCESS CASTINGS CO.

6922 CARNEGIE AVE., CLEVELAND, OHIO

Profit by our many years of experience


Shop box with movable partitions, any type card holder and handle
Box with inside corner ears, permitting stacking boxes on top of each other
Self draining heavy perforated box with runners. For washing purposes.
Tool boxes, of any size, with or without trays
Box with post inserts prevents contact of parts
Perforated containers for plating, pickling, etc.
Shop Stools
Shelf formed around top edge permits piling boxes to any height. (Right) open end gives access to contents when boxes are stacked on each other



Steel Piling Box with fixed or removable partition designed to hold one set of parts needed for any given assembly or sub-assembly. Big time-saver.

Stacking or Piling Box **of excellent design, strong and durable. Any size, to suit your needs. *Above:* Triple Hem Shop Box made with straight or tapered sides**

Shop Barrels, **any style or size, built for long life and hard service.**

Shop Stools **with steel, solid wood or laminated wood seats. Sturdy reinforced legs, of any desired height.**

Comfortable Back Rests **of several different designs, may be had at a slight extra cost.**

TO KEEP PRODUCTION *flowing smoothly*

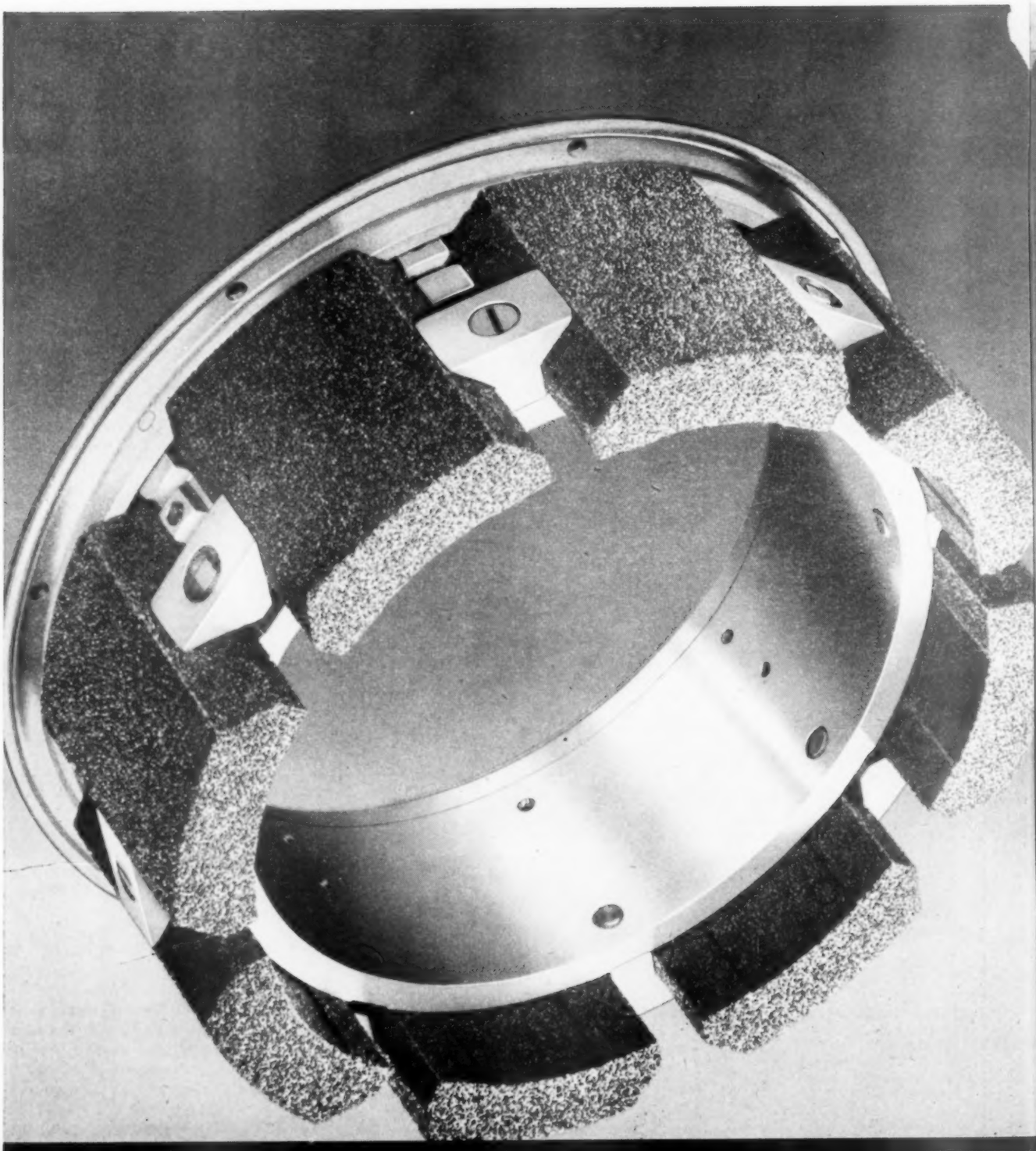
Where small, loose products are used or produced, perfecting the materials handling system is often the most important factor in attaining lower production cost. An essential part of the system is properly designed, light and strong metal shop containers for the pickup, collection, and conveyance of materials to and from machines, finishing, assembly, packaging and storage.

Cleveland shop boxes, barrels, cans, pans and pails are usually custom-made, because the small extra first cost is trifling compared with the advantages gained, year in and year out, by having containers of exactly the right size, shape and design to fit individual needs and special handling requirements.

Catalog, prices, and design service on request, without cost or obligation.

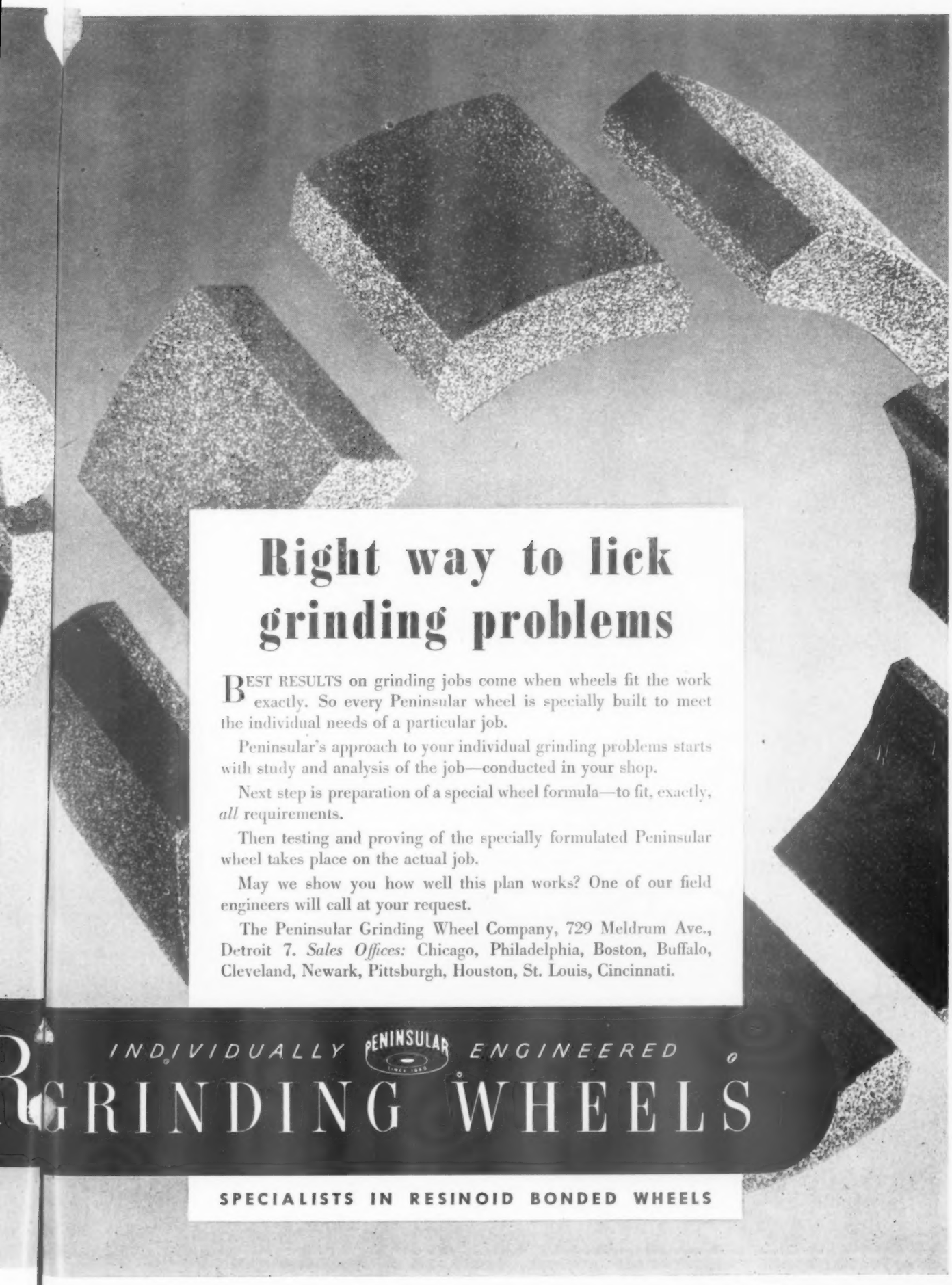
SHOP EQUIPMENT DIVISION
Cleveland Wire Spring Co.
5250 BROOKPARK RD. • CLEVELAND 9, OHIO

Cleveland **STEEL SHOP EQUIPMENT**
CLEVELAND WIRE SPRING CO.
2012 West 25th Street, Cleveland 13, Ohio
Subsidiary, Reynolds Spring Company, Jackson, Mich.



PENINSULAR

SINCE 1889



Right way to lick grinding problems

BEST RESULTS on grinding jobs come when wheels fit the work exactly. So every Peninsular wheel is specially built to meet the individual needs of a particular job.

Peninsular's approach to your individual grinding problems starts with study and analysis of the job—conducted in your shop.

Next step is preparation of a special wheel formula—to fit, exactly, *all* requirements.

Then testing and proving of the specially formulated Peninsular wheel takes place on the actual job.

May we show you how well this plan works? One of our field engineers will call at your request.

The Peninsular Grinding Wheel Company, 729 Meldrum Ave., Detroit 7. *Sales Offices:* Chicago, Philadelphia, Boston, Buffalo, Cleveland, Newark, Pittsburgh, Houston, St. Louis, Cincinnati.

INDIVIDUALLY PENINSULAR ENGINEERED

GRINDING WHEELS

SPECIALISTS IN RESINOID BONDED WHEELS

DEPENDABLE PERFORMANCE

By

B. S. & B STEEL FLASKS

is the reason for an ever growing list of users

Constructed to meet the requirements of the job.

Accurate
Strong
Durable

Would you like a copy of our new catalog?

★

BLACK SIVALLS & BRYSON, INC.

7500 E. 12TH STREET KANSAS CITY, MO.

you don't see IT

but you can buy IT

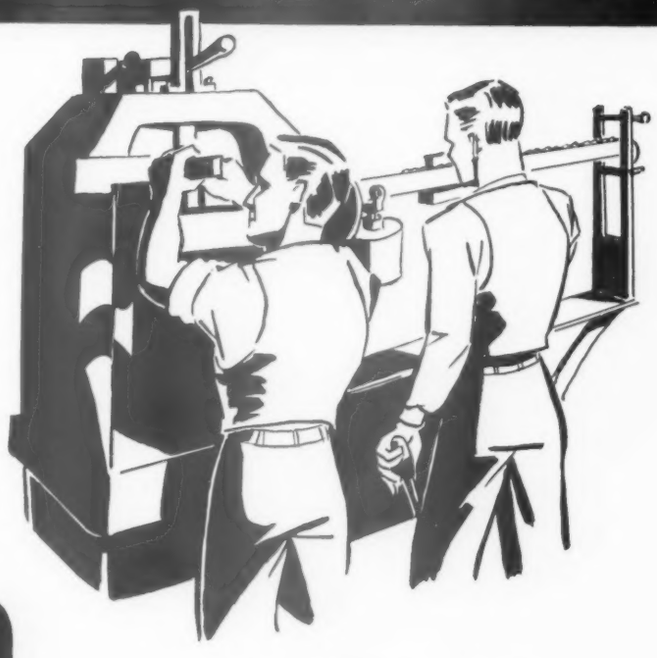
and IT makes consistently *Better* iron and steels

It is the unseen, unbilled "extra" you get in Ohio Ferro-Alloys . . . the natural result of

- Constant research along sound metallurgical lines to better the quality of ferro-alloys
- Improved, modern refining methods developed and employed in Ohio Ferro-Alloy plants
- Production-minded metallurgical assistance by practical technical men.

You'll appreciate the difference . . . it helps you to produce cleaner iron and steels, better structure, more accurate chemistry.

You are invited to put your ferro-alloy problems up to Ohio Ferro-Alloy staff men.



PHILO © OFA 1935 RAINIER © OFA 1941

Ohio Ferro-Alloys Corporation
Canton, Ohio

Chicago Detroit Pittsburgh San Francisco Tacoma

FERRO SILICON 50%, 75%, 85%, 90%
H. C. FERRO CHROME • FERRO MANGANESE
BOROSIL • SIMANAL
BRIQUETS
SILICON • MANGANESE • CHROME

A·O

Safety Goggles Safeguard the Eyes of Industry • Reduce Production Costs

and

AO Safety Clothing Protects the Worker from Head to Foot

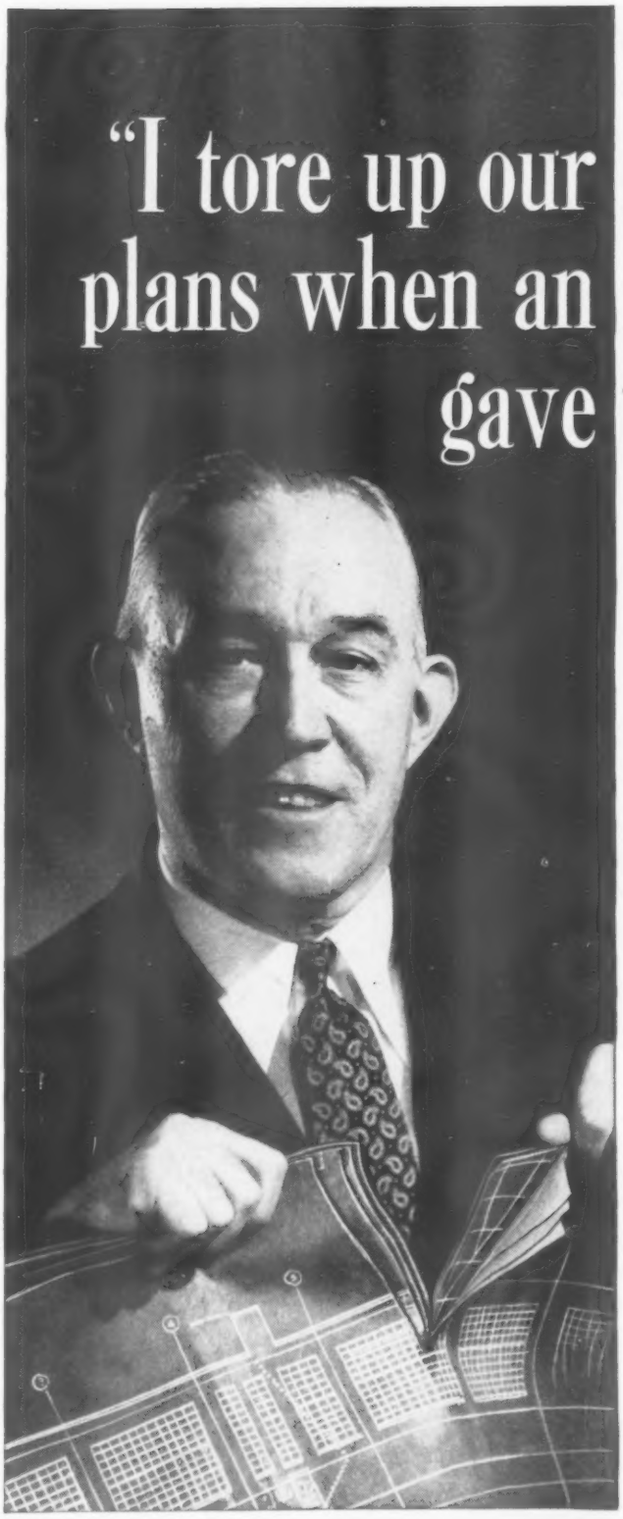
Every item in the complete AO Safety Line has been planned to provide maximum protection with the greatest possible comfort. This careful designing contributes materially to faster production and lower costs.

AO's Safety Line includes safety goggles of every type; respirators for protection against more than 140 hazards to lungs and respiratory systems; and wide variety of safety clothing and equipment. Your nearest AO Branch Office will be glad to send you complete details.

American Optical COMPANY *Safety Division*

SOUTHBRIDGE, MASSACHUSETTS
BRANCHES IN PRINCIPAL CITIES

"I tore up our plans when an gave us new warehouse A.T.C. Specialist 50% more FREE Storage Space



...AND CUT OUR HANDLING COSTS 30% IN THE BARGAIN!"

Yes, many a plant owner has saved himself the cost of a new warehouse because he let an A.T.C. material handling Specialist make a survey of his material handling costs.

Manual methods of storing raw and finished products often waste as much as 50% storage space. In the diagram to the left, see how much free storage space you can add to your present plant's capacity—how you take the work out of the job for your help, release more workers for more productive work.

An A.T.C. Specialist will show you how this can be done by efficient movement of your materials on Automatic Electric Trucks from receipt of raw materials through each successive handling procedure to storage and final shipment. These trucks are time-tested, brawny giants of electric power that lift, move and stack 1 to 30 tons with simple one-man operation.

They move through narrow aisles, turn sharp corners, go up and down grades whenever necessary. They speed up production, cut overall handling costs 30% to 60%, lighten labor's load.

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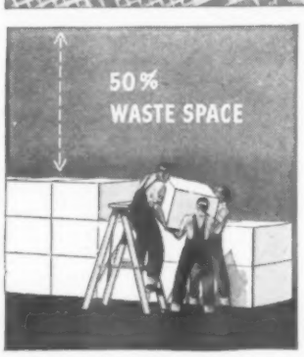

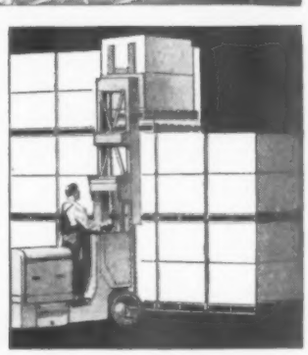

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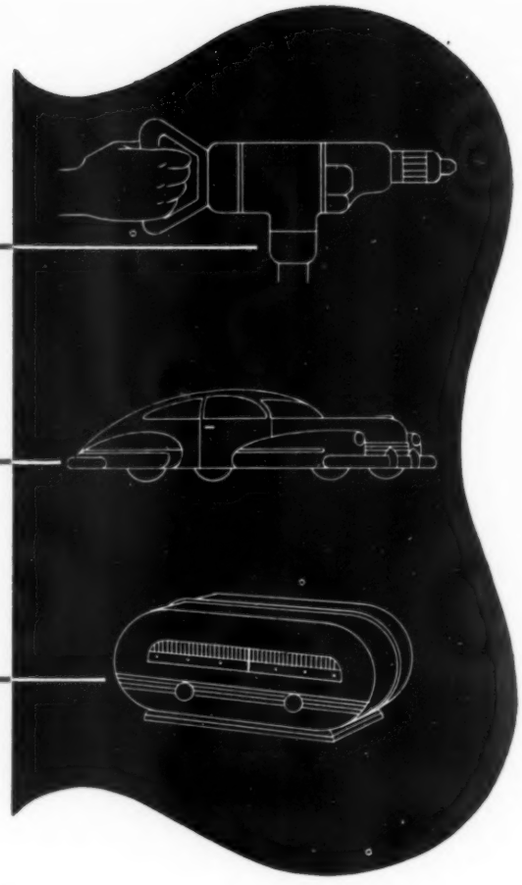

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Convention Demonstrates Faith in Foundry Future

MARKED success of the Golden Jubilee convention and exhibition of the American Foundrymen's Association held in Cleveland early in May demonstrated conclusively the far-sighted vision and enormous vitality of the foundry industry. A record attendance of approximately 20,000, tremendous interest in the technical phases of the convention and in the splendid displays at the beautiful Foundry Show, and a heavy movement in equipment buying, should prove beyond doubt that foundrymen of America are awake to the future opportunities of their industry as a supplier of basic components. Events at Cleveland demonstrated that foundry management understands full well its responsibilities, both to foundry workers and to purchasers of all types of castings.

In general, the technical sessions drew audiences which frequently taxed the capacity of rather spacious meeting rooms. Many of the papers were excellent contributions to the technical literature of the industry, and the informal discussions brought out much interesting and valuable data. From the official opening on Monday morning until the final tour of inspection by General Armstrong late Friday afternoon, the exhibition of foundry equipment and supplies attracted greater attention than any previous foundry presentation. In a country where industrial exhibitions constantly are becoming bigger and better, this Foundry Show ranked with the best.

While the records established at Cleveland should be a source of great pride to President Walls and the AFA officers and directors, and to Secretary Maloney and the staff members in the Chicago office, many of those in attendance at the convention could not help but feel that Ed Hoyt got by far the greatest satisfaction from the success of the finest of all foundry shows. Beginning with the annual meeting in 1898 he has participated in all AFA conventions, has been staging foundry shows since 1907, and has won recognition in this country as a leading authority on industrial shows. While he was provided excellent aid by an able and willing supporting cast, the 1946 Golden Jubilee exhibition was quite largely a product of his dreams. The show was great because it had the master's touch.

Magnitude of the attendance at Cleveland, while reflecting great credit upon the progressiveness of foundrymen in building for the future of the industry, presents weighty problems for those staging modern foundry shows. Cities centrally located to the majority of the nation's foundries, and equipped with satisfactory exhibition facilities, do not have sufficient hotel rooms to house such a large influx of convention visitors. While the situation this year was complicated by an unprecedented regular demand for hotel space and the fact one downtown hotel still is being used by the Navy, it is doubtful if all of the 1946 convention visitors could have been housed to everyone's satisfaction even under prewar conditions. This problem appears germane to all large industrial shows.

To the authors of papers, to all who participated in the activities of the convention and exhibition, and to the members of the Northeastern Ohio Chapter of the AFA and their ladies, who acted as hosts, THE FOUNDRY offers congratulations for a job well done.

Frank G. Steinebach

Editor

A·F·A MARKS

SHELDON V. WOOD
President-elect

MAX KUNIANSKY
Vice president-elect.

S ANNIVERSARY—

looks to future progress

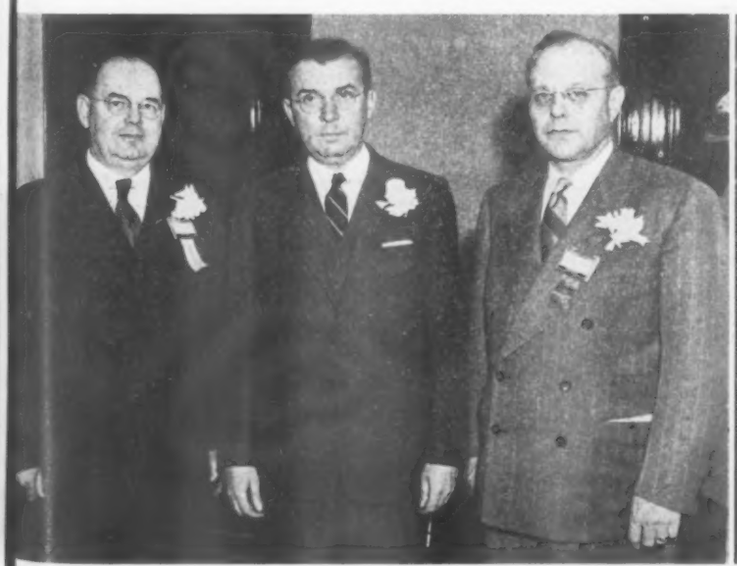
FROM all standpoints the recent Golden Jubilee Foundry Congress and Foundry Show of the American Foundrymen's Association appropriately marked the half century of progress of that organization. The approximately 20,000 people who participated in the program at Cleveland during the week of May 6 was the largest convention gathering in AFA history; the number of exhibitors of foundry equipment and supplies likewise established a new record, while overflow crowds were common in attendance at the full program of technical sessions held during the five days.

Various impedimenta, common to the times, in the way of convention attendance—including deficiencies in housing and railroad transportation—were insufficient to prevent registration at Cleveland from greatly topping expectations. Part of the gathering was contributed by the more than 5000 persons from the Cleveland district who attended the Foundry Show on Northeastern Ohio Day, May 7. For the first time in many years, a sizable group of European foundrymen was present to take part in an American foundry convention, while Latin American countries also were well represented.

Interest in the week's activities was equally divided between the equipment and supplies exhibits at Cleveland Public Auditorium and the discussions of foundry technology in the various technical meetings. Aluminum and magnesium foundrymen turned out in the largest numbers for the latter, reflecting the many developments which have occurred in the war-stimulated expansion of their industry. Visits to foundries of the Cleveland district likewise attracted considerable interest, more than 500 visitors taking part in the inspection trips arranged by a committee of the Northeastern Ohio Chapter of the AFA.

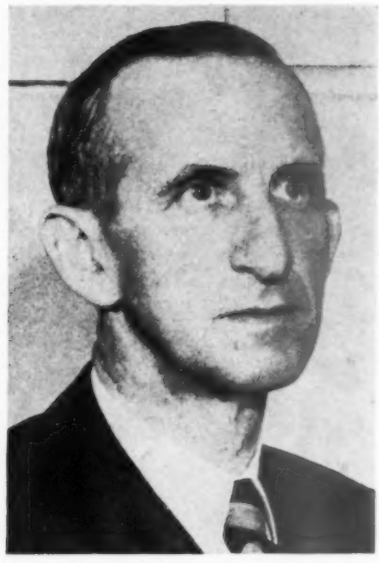
Ceremonies officially opening the convention were conducted on the Arena floor of Cleveland Public Auditorium, Monday morning. AFA Secretary William W. Maloney presided and first introduced A. C. Denison, president, the Northeastern Ohio Chapter, who welcomed the vis-

Far left—Scenes during Foundry Week in Cleveland. *Below left*—Participants in ceremonies opening the convention included, left to right, A. C. Denison, president, Northeastern Ohio Chapter and chairman of the general committee; Cleveland's Mayor Thomas A. Burke; Fred J. Walls, national AFA president. *Below right*—Hundreds of visitors took the opportunity to inspect Cleveland foundries during the week



Right—New directors elected to the AFA board for three-year terms. Fred J. Walls, retiring president, also was elected a director, to serve one year

HORACE A. DEANE



H. G. LAMKER

itors in the name of the host chapter. Greetings from the city of Cleveland were extended by Mayor Thomas A. Burke, who was followed by a message from Ohio's governor, Frank J. Lausche. The governor's welcome was read by Mr. Denison who, at one time, was associated with Governor Lausche in the Euclid Foundry Co., Cleveland.

Fred J. Walls, national association president, was the concluding speaker and paid tribute to the other foundry organizations which contributed to the success of the Fiftieth Anniversary convention, including the National Founders Association, Gray Iron Founders' Society, Magnesium Association, Steel Founders' Society of America, Malleable Founders' Society and Non-Ferrous Founders' Society. Representatives from various of these groups were introduced. Mr. Walls also read a letter from President Harry S. Truman extending congratulations on the foundry industry's wartime job and best wishes for success of the convention.

Annual business meeting of the association, which included the election of officers and directors and the AFA Foundation Lecture, was presided over by President Fred J. Walls. Mr. Walls introduced Tom Makemson, secretary of the Institute of British Foundrymen, who spoke for the more than 100 convention visitors from some 20 foreign countries in extending greetings and congratulations on the occasion of the 50th anniversary of the AFA. Mr. Makemson stated that the European foundry groups have patterned their organizations after the American association, and expressed appreciation for the assistance rendered by foundrymen of this country to the foreign societies.

Winners of the AFA annual apprentice contest were announced by Secretary William W. Maloney, and certificates and prizes were awarded by Mr. Walls. Winners in the various divisions were: Gray Iron Molding—First prize, Lawence Kinsinger, Caterpillar Tractor Co., Peoria, Ill., winner of the same prize in 1943 and in the armed services during the ensuing period; second prize, M. Tamburini, Warden King Ltd., Montreal, Que.; third prize, Harold Young, Cleveland Trade School, Cleveland.

Steel Molding—First prize, Robert Bina, Crucible Steel Casting Co., Cleveland; second prize, John Pietrzyki, Crucible Steel Casting Co., Cleveland; third prize, Jim Kraynak, West Steel Casting Co., Cleveland.

Nonferrous Molding—First prize, C. Corriveau, Montreal Technical School, Montreal, Que.; second prize, P. Blais, Montreal Technical School; third prize, H. Deschamps, Jenkins Bros. Co., Montreal.

Patternmaking—First prize, R. Dragon, Western Pattern Works, Montreal; second prize, John Yeich, Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa.; third prize, Michael Simenic, Aluminum Co. of America, Cleveland.

Mr. Walls, in his annual presidential address, pointed out that the association continues to pursue the original aims established upon formation of the AFA, and recounted the service it has rendered the past 50 years in the exchange of information relative to developments in the production of castings. AFA membership now exceeds 8500, he stated, in predicting continued growth in the organization and in the members' faith in future prosperity of the foundry industry.

Secretary Maloney next announced the nominating committee's selection of officers and directors for the 1946-47 year and, in the absence of additional nominations, cast

BRUCE L. SIMPSON

STOWELL C. WASSON

J. E. KOLB

a unanimous ballot for the following: President, Sheldon V. Wood, Minneapolis Electric Steel Co., Minneapolis; vice president, Max Kuniansky, Lynchburg Foundry Co., Lynchburg, Va.; directors, Fred J. Walls, International Nickel Co., Detroit; Horace A. Deane, American Brake Shoe Co., New York; Stowell C. Wasson, National Malleable & Steel Castings Co., Chicago; Bruce L. Simpson, National Engineering Co., Chicago; J. E. Kolb, Caterpillar Tractor Co., Peoria, Ill., and H. G. Lamker, Wright Aeronautical Corp., Paterson, N. J. The new officers and directors will take office at the annual meeting of the national board of directors in July.

The AFA Foundation Lecture, concluding the annual meeting, was presented by Dr. G. H. Clamer, Ajax Metal Co., Philadelphia, and comprised the first report on the research program being conducted at Battelle Memorial Institute, Columbus, O., under sponsorship of the Non-Ferrous Ingot Metal Institute, on test bar design and test bar practice as applied to 85-5-5-5 metal.

This study, of which Dr. Clamer's paper is only the preliminary report, is intended to point the way to better test bar practice which will benefit both producers and buyers of castings, by making test bars more indicative than in the past of the properties to be found in cast products. The study recognizes the fact that if test bars are to reflect quality of castings, the practice in production of bars must be standardized, so that the melt quality—the

amount of gas or gas formers contained in the molten metal—remains the only variable. In the investigations 11 different designs of test bars were studied to determine which one most effectively portrayed casting quality. Conclusions reached were that properties of castings are best reflected in test bars when they are: Navy 5/16-inch web Webbert or horizontal 5/8-in. web Webbert type, which appeared from the tests to be most suitable; the gate and sprue sizes are fixed; the mold is made horizontal and poured rapidly so that the sprue is kept full and the lip of the ladle is held low; the same sand is used for other castings as for the test bars, and when results are judged from an average of at least two bars.

While a spirit of general good fellowship, sparked by chairman H. S. Simpson, National Engineering Co., Chicago, and recent past president of the AFA, prevailed at the annual dinner of the AFA Alumni group, a serious note was struck by Henry Washburn, president, Plainville Casting Co., Plainville, Conn., who deplored the present economical, industrial, business and industrial jam in which the nation is enveloped. Description of a recent instance of gross usurpation of illegal power by a labor organization in his native state, was followed by a suggestion pointing toward a possible solution if adopted by "We The People."

The old fashioned New England Town Meeting was revived, where every man had the opportunity to express his opinion. In this instance they quickly restored law and order.

The Alumni group of the AFA is made up of past presidents, members of the board of directors and men who have been awarded medals or honorary life membership. C. E. Hoyt read messages of regret from several members who for various causes could not attend the dinner. In the spirit of the occasion Chairman Simpson earned the unbounded admiration of one and all by a marvelous feat of memory in introducing every member by name and by wittily happy comment.

Approximately 300 members of the Canadian delegation held the annual luncheon at noon Tuesday. The majority came from Quebec and Ontario, but representatives also arrived from many other districts, including Sydney, N. S., at the far East and Vancouver, B. C., in the far West. In accordance with Canadian custom a

A capacity crowd attended the annual dinner concluding the 50th Anniversary Convention of the AFA in Cleveland

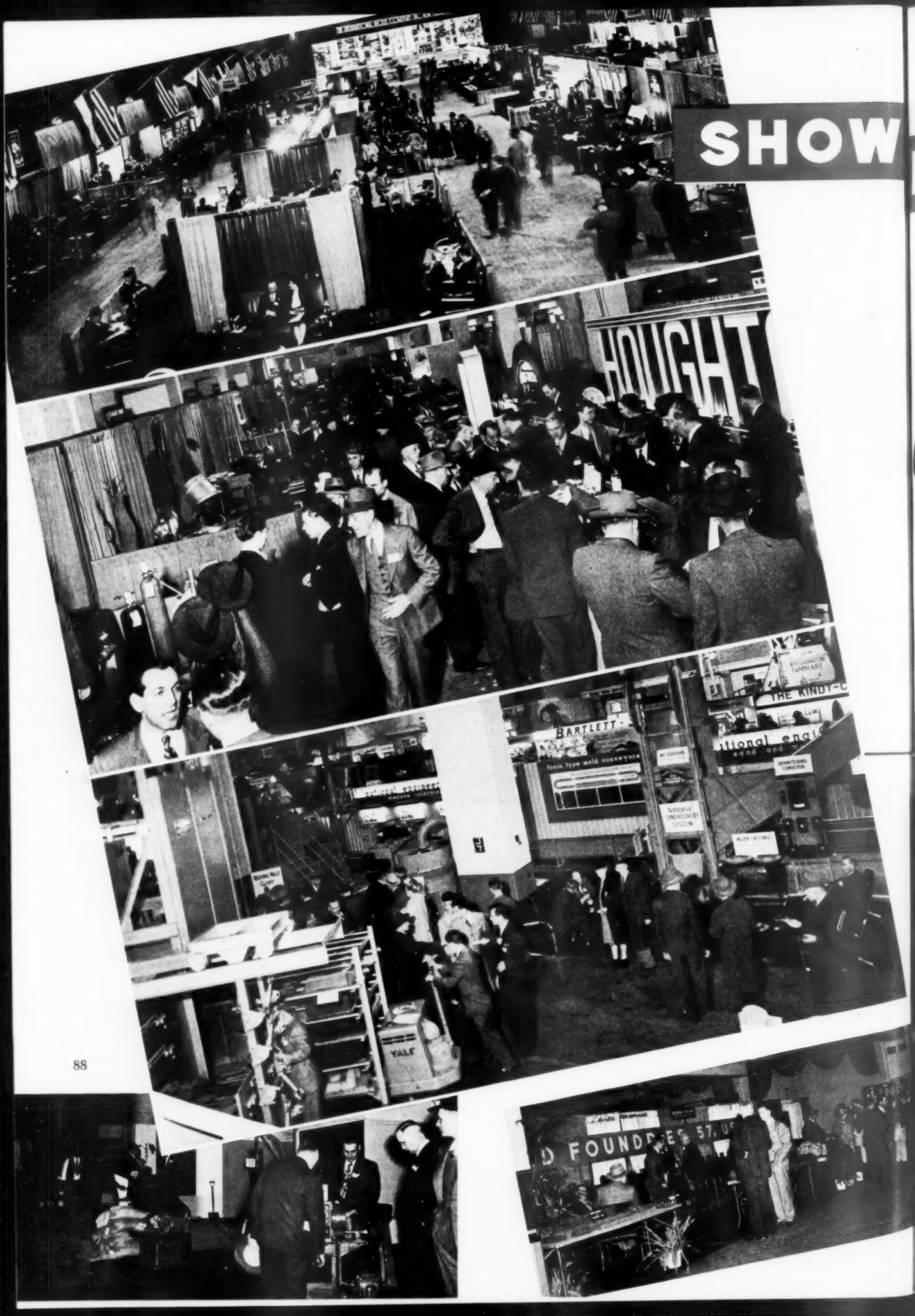
loyal toast was offered the King, and this was courteously coupled with a toast to the president of the United States. At the conclusion of the luncheon Chairman Joseph Sully, Sully Brass Foundry Co., Toronto, a national AFA director, introduced past and present officers of the Ontario and Eastern Canada & Newfoundland Chapters of the association. A special guest was Thomas Pierce, representing the Institute of British Foundrymen.

Annual gathering of AFA chapter officers and directors for dinner and informal exchange of ideas and viewpoints was held Tuesday evening. The affair was well attended, around 70 being present. No business was transacted other than an official welcome by S. V. Wood, Minneapolis Electric Steel Castings Co., Minneapolis, AFA vice president, and the self-introduction of visiting officers and directors. The new and enlarged Chicago headquarters staff was presented for the first time to chapter leaders. The informal event provides an ideal opportunity for mutual consideration of problems involved in chapter functioning and direction, and the exchange of suggestions as to how to bring the greatest good to the greatest number by meetings and educational activity.

Highlighting the entertainment of European and Latin American visitors was a reception for them Wednesday afternoon, sponsored by the Northeastern Ohio Chapter. The affair was entirely informal and provided an opportunity for better acquaintanceship between the AFA members present and the more than fifty foreign guests.

In keeping with many other features of the convention, the annual dinner of the association, held at the Hotel Statler on Friday evening, was one of the largest from the standpoint of attendance in the history of the association. With President Fred J. Walls presiding, the program included special music, the presentation of the awards of the association, and an address on "The Foundry in War and Peace" by Brig. Gen. Donald Armstrong, commandant, the Industrial College of the Armed Forces, Washington.

Under the direction of Past President Ralph J. Teetor, chairman of the Board of Awards, the William H. McFadden Gold Medal was presented (*Please turn to page* 144)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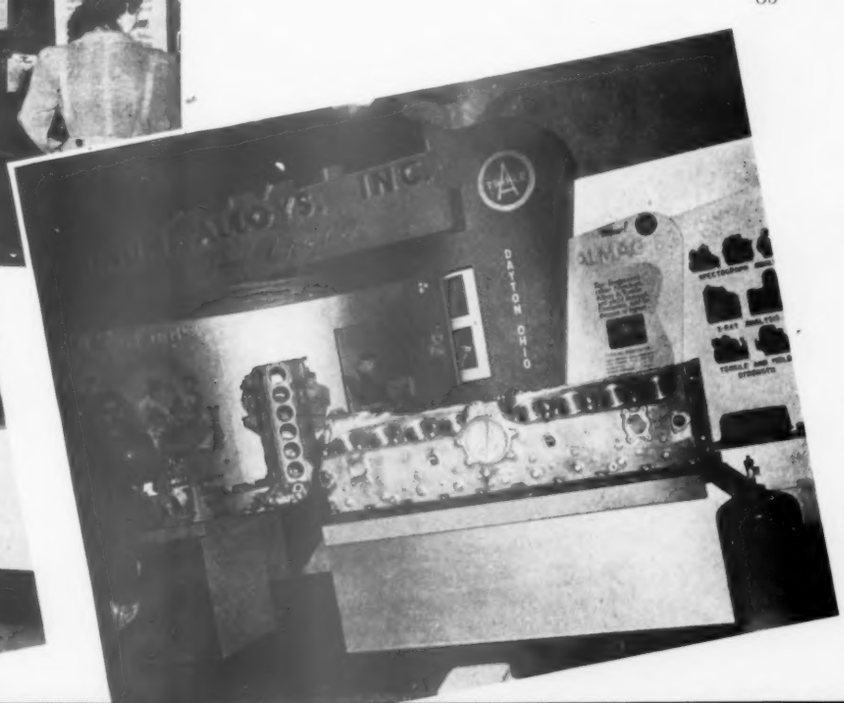
PORTRAYS

foundry of tomorrow

ALL records were broken by the Golden Jubilee Foundry Show of the American Foundrymen's Association held in Cleveland's Public Auditorium, May 6-10. Floor space occupied, which included all of the auditorium and exhibit halls, was the largest in history. The approximately 290 exhibiting companies exceeded previous records, and the total attendance reached the all-high mark of approximately 20,000. Likewise, the 1946 show exceeded any previous effort in general attractiveness. In the opinion of many observers, this exhibition of foundry equipment and supplies was by far the best industrial show that has been held in America since the close of the war.

A number of new ideas in design of foundry equipment and in methods of producing castings were exhibited, and many companies showed important improvements to their lines of machines and supplies. However, lack of time since the end of the war and various production difficulties prevented a number of companies from showing new developments which have been under consideration for some time, and which will be introduced later.

Exhibitors reported an unusual amount of buying. This is in keeping with the general trend toward improvement in plant equipment and operating methods which has been under way in the foundry industry since the close of the war. The 1946 show should accelerate this movement.



Vacuum PERMANENT M

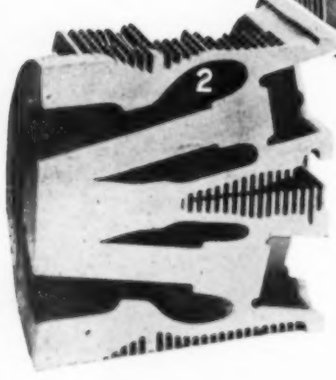


Fig. 1—Cylinder head produced in Czechoslovakia, later in Germany, by the vacuum process

Fig. 2—Castings for 6½-in. diameter bore engine. Left head sectioned to indicate method of pouring

Fig. 3—Pitch of fins on these heads ranges from 12 mm down to 5 mm. Heads are 16 to 18 in. diameter

THE vacuum casting system, which was developed in France and, during the war, spread over the continent, was originated by M. Bruneau, who conducted a small experimental foundry in Paris. He really was an artist who considered his function in life that of developing the foundry industry and its applications. He did no production work himself but developed molds for specific jobs for his customers, who then took over the equipment and put it into production.

From general experience in the permanent mold business it was found there was a great need for a means of casting thin sections. While the normal section thickness is approximately 0.11 to 0.152-in., depending on the area considered, a considerable demand existed for castings with sections down to .030-in. Castings with such sections also could be produced by die casting, but die casting process did not give the physical and chemical properties required to meet the function which the casting had to perform in service. This, then, was the line on which M. Bruneau decided to devote his energies, with the result that he finally evolved his system of controlled vacuum casting, enabling extremely thin sections to be cast.

In 1936, the writer was engaged in research and production work for Rolls-Royce and there was a need for development cylinder heads to be made by the permanent mold process. This process was absolutely essential, as a sand cast cylinder head would not stand up in service because of the high compressure ratio used on this particular development motor. Neither was it possible to produce the finning system by machining from a forging. This finning system of controlled air flow for the dissipation of heat was a new feature of the design.

The writer happened to be in France visiting the Gnome et Rhone plant and in talking with their engineers was told of the developments that were going on at the Bruneau foundry; at that time a cylinder head was being de-

Difficulties in casting thin sections by the permanent mold process may be overcome by making use of atmospheric pressure to force molten metal into a cavity from which the air previously had been evacuated. The vacuum casting system described by the author originated in France and found successful and widespread application in Europe during the war for cylinder head work

T MOLD Casting

By MAJ. JACK W. WHEELER
Light Alloy Castings Consultant
Springfield, Mass.

veloped for use in Czechoslovakia. The result of this conversation was that the process was investigated, finally brought to Great Britain and there employed under license. This article is intended to give a brief description of the products made and the basic principles of the system.

Naturally, at that time, the greatest field for development lay in the production of aircraft cylinder heads by the permanent mold process, which method would give the manufacturer a fairly close grain structure, higher chemical properties, closely pitched fins of the required sectional thickness and a clean exterior, permitting good air flow and cooling conditions.

Early Castings Crude in Appearance

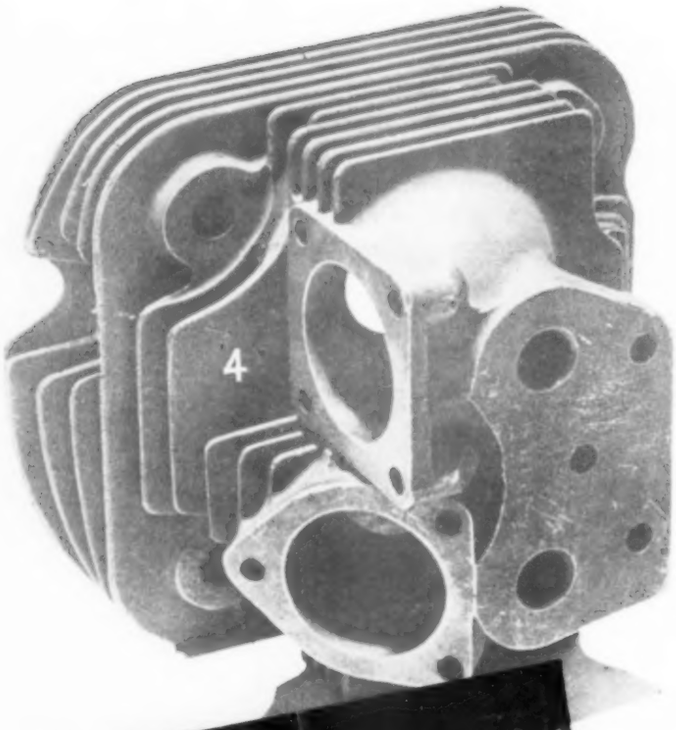
Fig. 7 shows some of the basic cylinder heads developed by Bruneau Freres. All of these were made of Y alloy, and it will be noticed that the head design is about the year 1930 and the pitch of the fins is only in the order of 0.25-in. Fig. 4 illustrates the best results that had been attained in Great Britain in a normal gravity cast cylinder head; the fins in this case were 0.280 pitch and 0.09 thick at the tip. From a rough examination, it will be seen that these cylinder heads are quite crude compared with present-day practice.

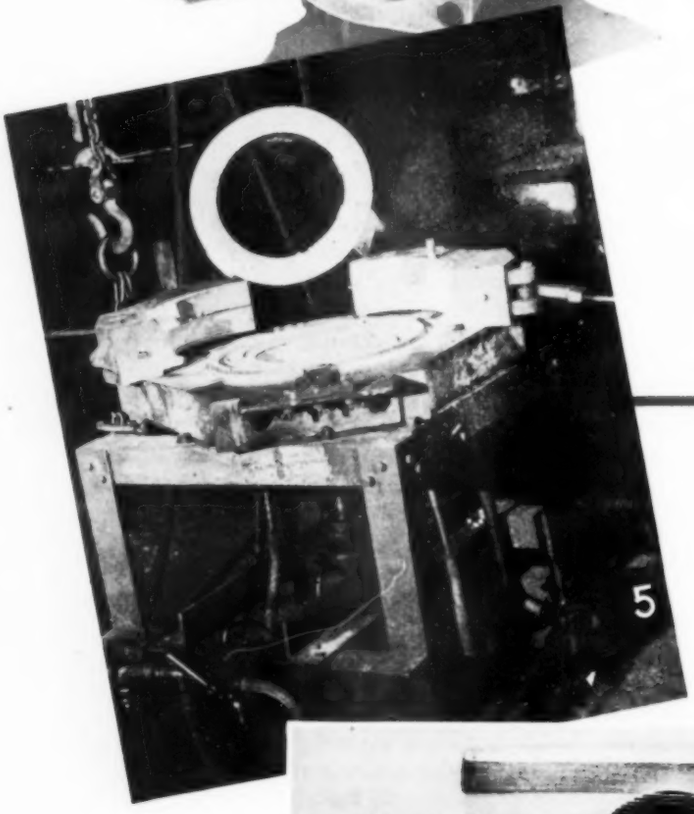
The next step is shown in Fig. 3, which represents later type cylinder heads with the pitch of the fins running from 12 mm down to 5 mm. These heads also were much larger, being some 16 to 18 in. in diameter and the draw of the fin in some cases being 5 in.

Fig. 1 shows a head produced in Czechoslovakia by the Bruneau process, having fins of 5 mm pitch and also with angular inter-sections and a complete air flow between the inlet and exhaust passages. This head was produced of Y alloy with considerable success and the identical molds were later used by the Germans continuously up to 1940. According to the report of a visitor returned recently from Germany, the vacuum process was applied to production of all cylinder heads there including the experimental air-cooled diesel motor designed for tank work.

The foregoing remarks will give an idea of the development and application of the process and we will now turn to a few of the fundamental details. First of all, it must be realized basically that the theory behind the vacuum casting is to evacuate the section of the mold that has a thin area, which in effect allows a pressure of approximately 14 psi, which is normal atmospheric pressure, to force the molten alloy into the cavity. Very probably the better term for the process would be sub-atmospheric casting, for, after all, its feature is not the sucking of the metal into the mold but the taking advantage of atmospheric pressure.

Fig. 2 shows two castings for a 6½-in. diameter bore engine known as the Potez. The lower casting will give an idea of the method of pouring. From careful examination of this part it will be seen that the combustion space and the exhaust passages are formed by sand cores—three in all—the combustion space being one core, with separate cores forming the valve passages standing out of the base. The casting is made with the rocker faces downwards and the combustion space facing up. The sand core forming this space and runner openings is a hard baked oil sand core, fully dried without any chills, and the metal is introduced through the center area, extending some 4 or 5 in. higher than shown in the photograph—that is, 4 or 5 in. above the sawing off lines which are shown. This core is hung downward—the metal flows down through the center onto the guide valve bosses which are solid, and then into the thin area and back up around the cylinder barrel face. This cylinder barrel face is extended and has two risers; the sawed-off portion of one can be seen. These risers allow complete flow through of the metal, and any oxide or dross formed during the pouring process is carried





out into the riser. Usually the anticipation is verified.

It will be noticed too that there is a feed to the absolute center of the head, which point is very highly stressed, as the exhaust passage of the cylinder head in use is very hot and the inlet passage cold, inducing extreme thermal conditions across this area. It will also be noticed that there is a complete division or separation of the cooling fins between these two areas, which enables the exhaust side to expand freely and the inlet side to contract under the influence of the incoming gas mixture; to tie these fins up would induce a high stress resulting in cracks.

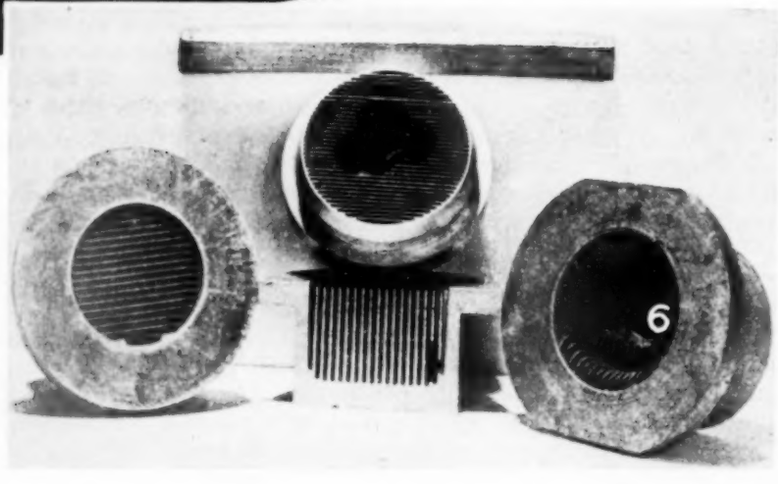
Along this same division line lie the spark plug bosses, which means that you have two valve apertures, two spark plug bosses in a small area of very high concentrated stress. In actual use it was found that these cylinder heads were extremely satisfactory due to this method of feeding, which fed the metal to the right place in the right quantity and at the same time allowed progressive solidification of the casting, the outside solidifying first and the center feeder doing its job feeding into the stressed areas until the solidification cycle was completed.

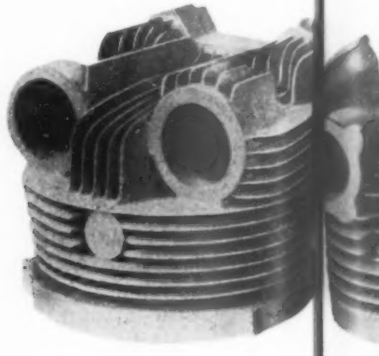
The application of vacuum in this case is interesting as it will be seen from the top casting in the illustration that the lower nine fins are larger than the balance and have the fin sections made in four separate blocks, parting at 90° angles. During the casting process these fins were uppermost as shown by the section casting and, naturally, due to that area and their position in the mold, greater difficulty was experienced in filling these fins.

On the right-hand section of the casting will be observed a typical misrun at the lower seven fins. Therefore, it was found necessary to apply a more complete vacuum to this area, and in actual production the lower series of

Fig. 4—This head, produced as a gravity cast part, represented the best effort in its time but is crude compared with present-day practice

Fig. 5—Production of this vane ring housing was facilitated by the use of the vacuum casting system





fins, which received the direct flow of hot metal plus the full effect of the weight of the metal, required a vacuum of only approximately 7 lb while these large fins, higher up in the mold which received more sluggish material and somewhat cooler because of the distance travelled, required a complete vacuum to make them fill satisfactorily. These fins were 0.030-in. thick at the tip, with 1° included taper. This meant 2° of vacuum were necessary, and to obtain this, a system was developed whereby a single central decompressor was used and by tapping into large capacity storage tanks with the various degrees of vacuum. These storage tanks were then piped and controlled by stop valves and attached to cover plates on the exterior of the mold, the cover plates sealing the heads of the cores forming the cylinder fins.

Naturally, in this type of design the cover plates had to be removed prior to the withdrawal of the fins themselves. This particular mold naturally was slowed down by this operation, since first the cover plates had to be removed and then the fins eased out by a pinch bar mechanism before the mold itself could be opened and the casting extracted. This slowed down the production rate to 12 castings per hour. The mold itself was maintained at a fairly high temperature of 550 to 600 F and the Y alloy material poured at a normal temperature of 1310 F.

The problem involved in the production of the sleeve-valve type cylinder heads shown in Fig. 6 is somewhat different to the foregoing. These cylinder heads, particularly the one illustrated in the center, which is the Bristol cylinder head used on the Centaurus, need extremely closely pitched fins. In this particular example, the pitch is 1.2 mm with a tip thickness of 0.025 to 0.030-in., having ¾° included taper. Depth of the fin is comparatively short, approximately 1¾ to 2-in. but it was very essential that these heads be sound. The other heads illustrated have wider pitched fins but of much greater depth. Actually, one reaches 4 in. in depth.

The casting on the right illustrates the type of fin form required to accommodate the air cooling system previously mentioned. Examination of this casting will make immediately apparent the impossibility of producing this component under any other system than that of casting.

Referring back to the Bristol cylinder head, this casting was made on its side as shown in the illustration, the downright coming in vertically from the right-hand side and extending completely around the casting. Maximum vacuum was used at all times on these fins, and the flow of metal was across the fin with adequate provision made for feeding the solid rear necessary to produce the grain size and strength required by inspection standards. This particular cylinder head was a high production job of some 60,000 castings per week, which presented a problem in making the cores forming the fins; this is dealt with later.

Cores Extended From the Molds

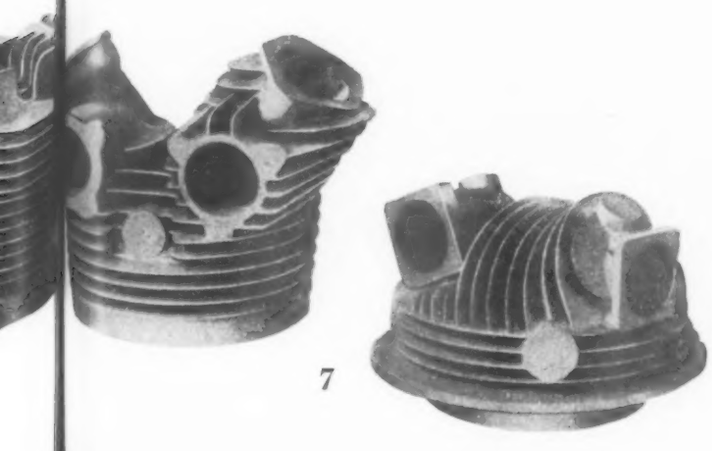
Fortunately, with this high production mold it was unnecessary to remove the vacuum cap placed over the ends of the cores forming the fins. These cores were extended from the mold several inches. The center core had a 1-in. diameter hole and the corresponding cores on each side of it had the same diameter hole, elongated 1/16-in. progressively. Through these holes was placed a steel pin which ran in an annular groove in the vacuum cap which, in turn, had a female thread engaging on a male thread projecting from the rear of the mold. Therefore, the function of extraction was to rotate the vacuum cap which drew itself back on the screw thread and the internal angular ring bore at the same time on the pin running through the fins. As this pin drew the central fin first, it engaged the next fin after a 1/16-in. travel, and so on, until all the fins were extracted. The casting could then be withdrawn and to reverse the procedure the cap was screwed on again with the rear internal face of the cap butting up against the ends of the core fins, thus holding them in position in the mold. This made a rapid process of mold operation, giving a production rate of 18 to 22 castings per hour.

When servicing became necessary, it was the custom to unscrew completely the vacuum cap which withdrew the complete set of core fins held in position by the 1-in. diameter pin located inside the cap. These fins were returned to the mold servicing section and immediately replaced with a new set ready for work.

The number of castings produced before servicing of these thin cores became necessary depended very considerably on the manufacture of the fins and the manner in which they were treated before use. Many kinds of steel were tried and due to wartime restrictions, etc., a standard common hardening steel of rolled stock was finally used. The parallel portion of the core would be highly polished and the profile of the fin ground on the end of the core section. Here, it is necessary that this grinding is not a straightforward operation as it is essential in the case of the thin fin that the grinding marks themselves run in the direction of the withdrawal of the core. This was found after a matter of experiment and if it is carried out, the failures due to a portion of the cast fin sticking to the core will be cut considerably. (*Please turn to page* 268)

Fig. 6—Sleeve-valve type cylinder heads with closely pitched fins. Head in center has fin pitch of 1.2 mm with tip thickness 0.025 to 0.030-in., depth 1¾ to 2 in. Others have deeper fins, wider pitch

Fig. 7—Some of the basic cylinder heads developed about 1930. Pitch of fins is only about 0.25-in.



7

Checks Casting Quality

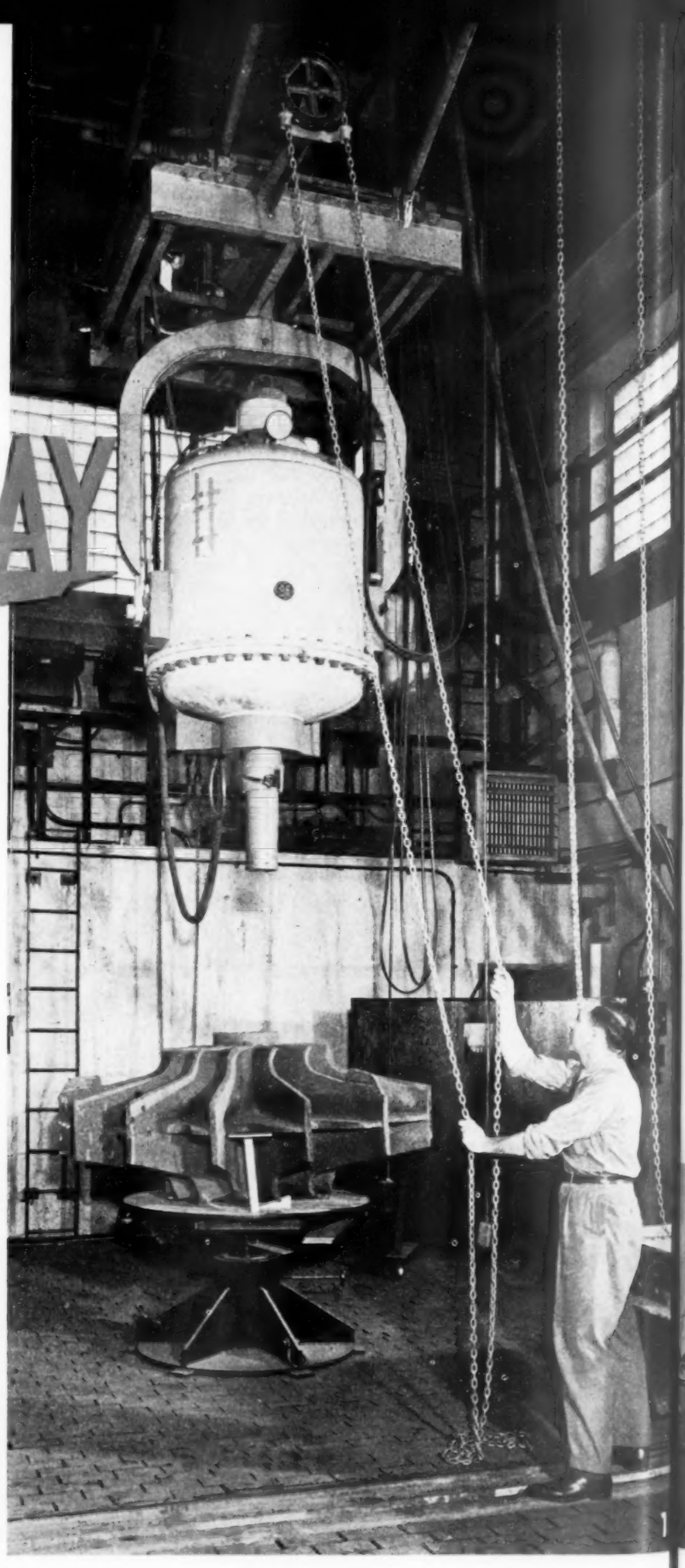


Fig. 1—Lowering x-ray tube into proper position prior to exposure at x-ray laboartory of Bethlehem Steel Co.'s steel foundry, Bethlehem, Pa.

Fig. 2—Dark room x-ray laboratory

Fig. 3—Plates can be passed directly from film dryer at left into adjacent viewing room

INSTALLATION of a 1000-kv x-ray unit in the steel foundry at the Bethlehem, Pa., plant of Bethlehem Steel Co. adds another producer of quality castings to the group of foundries employing million-volt equipment as an inspection and control tool in their foundry technique. Such equipment permits the inspection of heavy sections with a minimum of exposure time. The Bethlehem unit is designed for the routine inspection of heavy sections of steel up to 8 in. in thickness.

Detection of internal defects in castings, although the primary function of radiography, is by no means the sole advantage offered by this inspection method. Radiography affords a rapid nondestructive check on the soundness of production castings and permits the inspection of a larger percentage of the product than would otherwise be possible. Such production control enables the foundryman to verify his molding technique on a day-by-day basis, and if changes are indicated they may be made quickly without waiting for slower radiographic results or the costly sectioning of one casting. Routine radiographic inspection has a further application for intricate castings, with particular reference to areas which may be highly stressed in service. Castings so inspected may be used with complete confidence for service in fields where higher stresses are encountered.

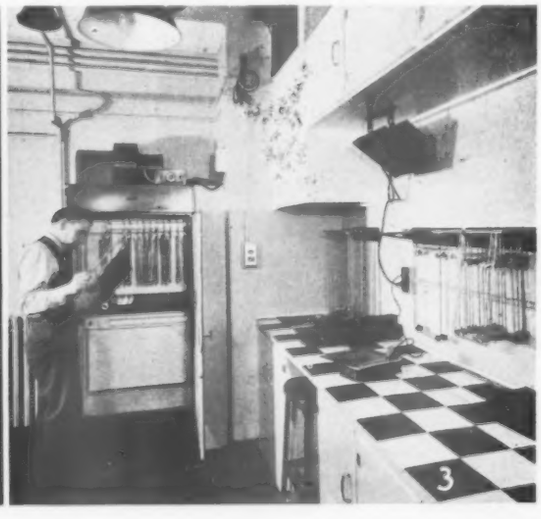
Examination Assures Reliability of Material

In instances where repair welding may be necessary, a rapid radiographic survey of the area in question reassures both foundryman and customer that an adequate amount of metal has been removed and the welding properly done.

In order to utilize high speed radiographic equipment to the best advantage as a production control tool in the foundry, facilities must be provided for the rapid positioning of castings for x-ray exposure. Handling equipment must permit numerous exposures on a variety of casting sizes with emphasis on ease of manipulation and safety.

The generating unit of the new x-ray machine installed at the Bethlehem plant consists of a low frequency resonance transformer with a multisection x-ray tube mounted at the center of the transformer. Both are housed in a tank of ¼ in. steel plate, 3 ft in diameter and 4 ft high, weighing about 1500 lb. Both the transformer and the tube are insulated from the grounded steel tank by a special gas maintained at 60 psi pressure. The x-rays are generated from a target mounted on the end of an extension chamber projecting from the lower end of the tank.

The tank is assembled in a cradle carried by overhead crane running on a track 28 ft above the floor, and is easily maneuvered into any position in the room. The cradle carrier can be rotated 360° on the yoke of the crane, (*Please turn to page* 262)



AIRCRAFT QUALITY *Castings*

By THOMAS E. PIPER
Chief Process Engineer
Northrop Aircraft Inc.
Hawthorne, Calif.

FOREMOST in aircraft engineering design is the proper selection of materials to be used in the fabrication of airframe structures. This selection depends upon the weight-strength ratio of the materials, their physical characteristics, adaptation to processing, procurement and methods of quality control. The safety of the airplane and the manufacturer's reputation are entirely dependent upon the methods of controlling quality in properly designed parts.

Since safety must be achieved by designing to the very limit of the capacity and endurance of the airplane as a whole, the design of a structural part is governed not only by one or two of its physical properties, but by a combination of several of them together with the function of that part and its useful life.

A conservative example of this is the comparison of magnesium alloys with steel. Magnesium, which is 23 per cent the weight of steel and 64 per cent the weight of aluminum, is relatively stronger than either in resilience, damping capacity, toughness and stiffness or strength in bending, buckling and resistance to elastic deflection where greater thickness is permissible in design. In hardness, tensile and shear strengths, magnesium alloys are comparatively weak.

Castings Take Place of Forgings and Machined Parts

The Northrop company was obliged to use castings in its *Black Widow* night fighter airplane where forgings and machined parts previously had been used. This was necessitated by the shortage of available forging equipment and machine shop time in this country during the war emergency. There are 1028 castings in the *Black Widow* having an aggregate weight of 845 lb or 5.54 per cent the total weight of the airplane.

Cognizant of the fact that a comparatively large number of castings were to be used in the airframe of the *Black Widow*, many of which were in strategic locations, the quality control inspection of castings immediately became a vital operation. Realizing our weakness in this field and our lack of knowledge on the subject, a survey was made to determine what possible steps could be taken to ensure that only aircraft quality castings were accepted. Results of this survey indicated that the use of the x-ray and physical destruction tests on each type of casting would give us greater assurance of safety.

In order that our personnel might be properly trained in x-ray methods and radiographic interpretation, three men were sent to Stanford University. Upon completion of a course in x-ray and radiographic interpretation, these men established the Northrop

Top left—*Black Widow* night fighter airplane contains 1028 castings having an aggregate weight of 845 lb.

Fig. 1—Control panel and viewing screen on high-power portable industrial fluoroscopic x-ray machine

Fig. 2—Loading platform and main control panel of 250,000-v x-ray machine

Fig. 3—Loading and unloading platform on high-power portable industrial fluoroscopic x-ray machine

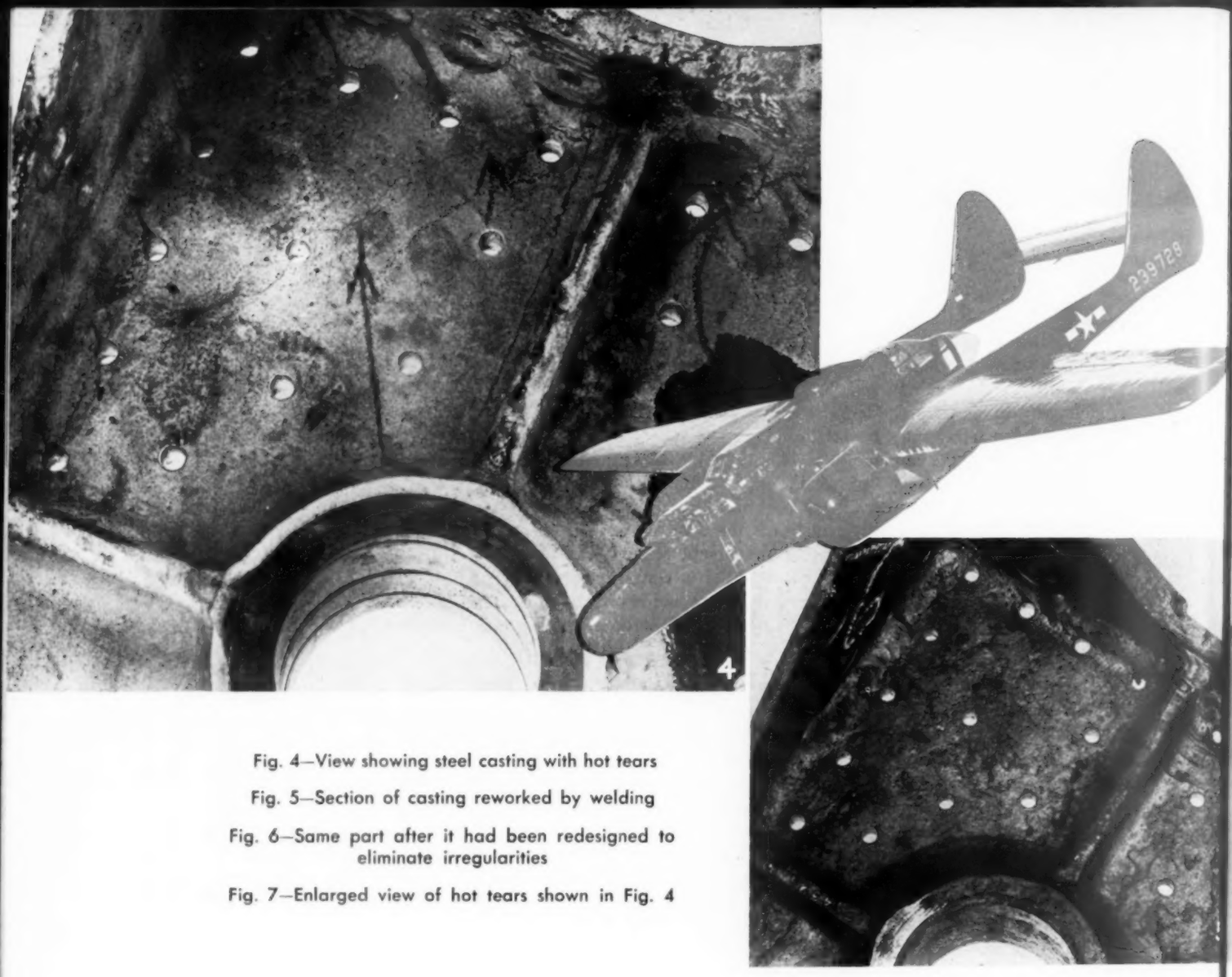


Fig. 4—View showing steel casting with hot tears

Fig. 5—Section of casting reworked by welding

Fig. 6—Same part after it had been redesigned to eliminate irregularities

Fig. 7—Enlarged view of hot tears shown in Fig. 4

x-ray and castings quality control procedure which in short consisted of:

1. Furnishing stress marked drawings to the x-ray laboratories and foundries. Color designations of red or green on these drawings indicated primary or secondary stressed areas. Unstressed areas carried no markings.

2. Final interpretation of radiographs by the company, thereby permitting better foundry co-ordination and allowing Northrop to accept castings having defects in unstressed areas that normally would have been rejected.

3. Preparing a radiographic acceptance standard for each type of casting by testing to destruction the three worst castings out of the first one hundred castings poured and accepted in accordance with Specification AN-QQ-M-188.

After Northrop became more experienced in x-ray methods, the practicability of using the fluoroscope as a "culling" tool to supplement radiographic inspection was considered and investigated. Two major manufacturers of x-ray equipment were contacted and inquiries were made as to the possibilities of securing a fluoroscope for experimental purposes. The replies were discouraging as the fluoroscope was deemed an impractical tool for casting inspection.

X-Ray Products Corp., Los Angeles, was manufacturing stereo-fluoroscopic machines for medical applications, and after discussing our problem with them, they agreed to construct a fluoroscope for experimental testing. Within three months this machine was in operation.

The next step was to evaluate the definition produced by the fluoroscope as compared with radiography. To accomplish this, X-Ray Products in collaboration with Northrop analyzed 489 lots (33,777 castings) of castings by x-raying independently through the fluoroscope and radiographic equipment and recording comparative findings. The results were very satisfactory. The fluoroscope proved to have limitations but as a "culling" tool for large defects and as a supplement to radiographic inspection

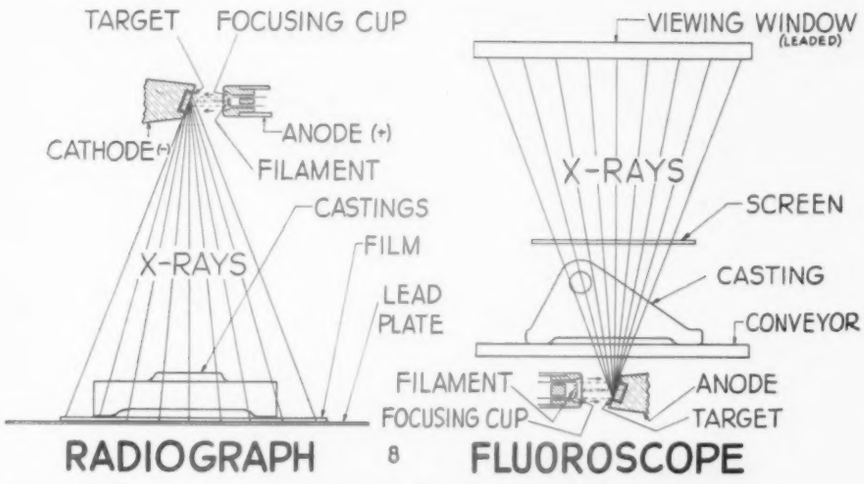
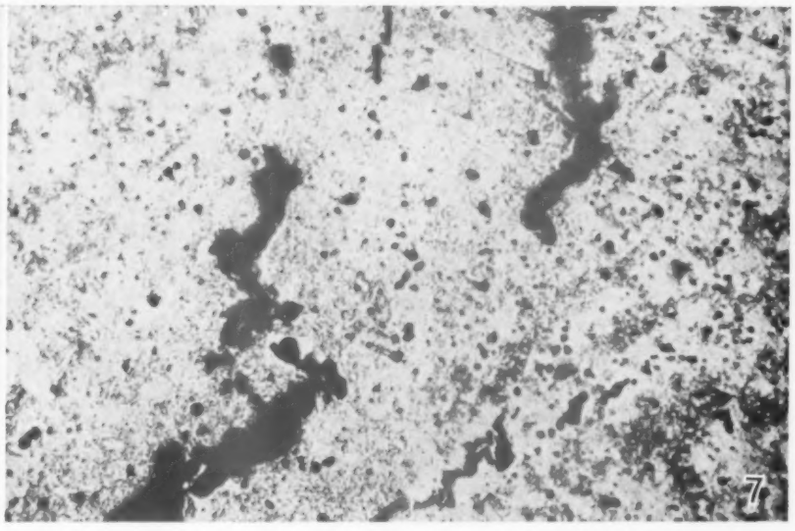


Fig. 8—Sketch showing arrangement of work and x-rays in making radiographs and in fluoroscopic examination of castings



its usefulness became apparent. Because visual acuity is not as sensitive as an x-ray film in recording an image, uses for the fluoroscope were definitely limited. Radiographic sensitivity is less than one-thousandth of an inch or ½ of 1 per cent whereas the fluorescent image, due to screen and eye sensitivity, is 1/64-in. A detail comparison of fluoroscopic and radiographic inspection results is shown in the accompanying table.*

Satisfied with the results obtained from this evaluation, Northrop requested that all lots of castings applicable to fluoroscopic inspection receive 100 per cent inspection by the fluoroscope prior to and supplementary to 25 per cent or 10 per cent radiographic inspection, the percentage of the latter depending upon the classification of the casting. To save unnecessary machining of defective castings or to determine variables in wall thickness, Northrop requested that non-classified castings sometimes be fluoroscoped or radiographed.

To further exploit the fluoroscope as an inspection tool a program was instituted at the California Institute of Technology under the sponsorship of the Office of Production Research and Development of the War Production Board. This program covered investigations to:

1. Determine the limitations in reliability, definition, and contrast of fluoroscopic methods of examination of metallic materials in comparison with radiographic methods.

2. Determine the field of usefulness of fluoroscopic methods as supplements to or replacements of radiography of metallic materials.

3. Extend the field of usefulness of fluoroscopy by improvements in equipment and technique.

As a result of this project, two major modifications of the fluoroscope machine were completed. These modifications included:

1. Provision for easily controlled motion and positioning of x-ray tube head beneath the specimen being inspected, both vertically so that tube-object distance could be

varied, and horizontally (at right angles to the direction of the conveyor travel) so that an apparent rotation of the specimen in this direction could be obtained.

2. Replacement of the original lead glass viewing window with a plastic cell filled with lead perchlorate, which would not darken under the very intense x-rays obtained at short tube-object distances.

Two fluoroscope machines incorporating the above improvements were constructed, one by X-Ray Products for production use, and the other by California Institute of Technology for further research.

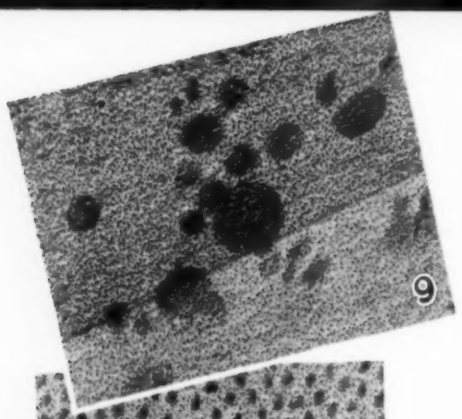
Castings, while appearing alike, have structural and dimensional irregularities. Sand, die and permanent mold castings when cast consecutively and from the same heat, contain inherent irregularities which show up in x-ray and precision inspection. The control of these irregularities is the primary problem in the engineering use of castings. Because of the many variables possible while the metal is a-borning, such as the quantity of ingredients, chemical segregation, finish and heat treatment, a close inspection is necessary to ensure that high strength requirements and quality standards are fully satisfied.

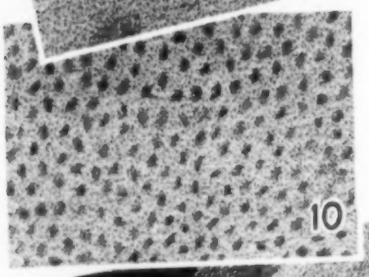
The irregularities common in aircarft castings as shown by x-ray that may be corrected by foundry technique are:

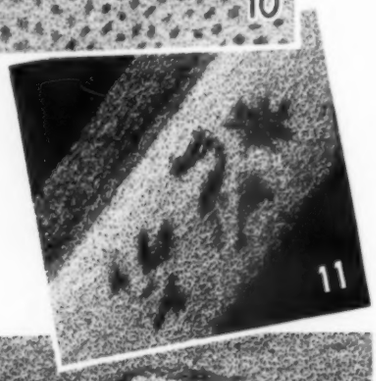
Gas Holes (Fig. 9): Gas holes or blow holes usually appear as smooth, well defined elongated or rounded darkened areas on the radiograph. They are caused by gas trapped in the metal.

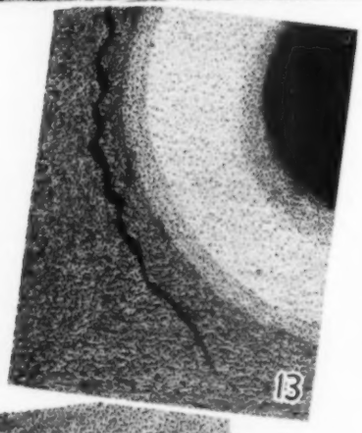
Gas Porosity (Fig. 10): Gas porosity appears on the radiograph as well distributed peppering of rounded or irregular dark spots which may be elongated or curved. These dark spots are indicative of miscroscopic or macroscopic holes caused by gas dispersed throughout the molten metal.

Dross or Slag (Fig. 11): Dross or slag are impurities trapped within the casting. Dross usually appears on the radiograph as irregular shaped darkened spots or areas.

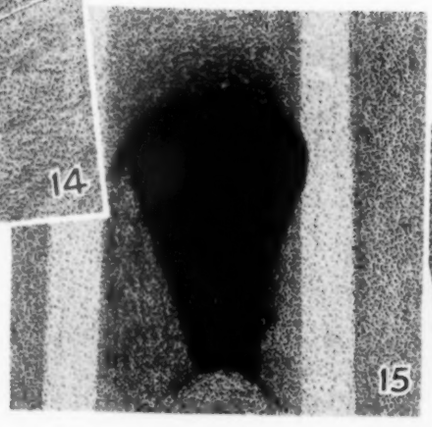


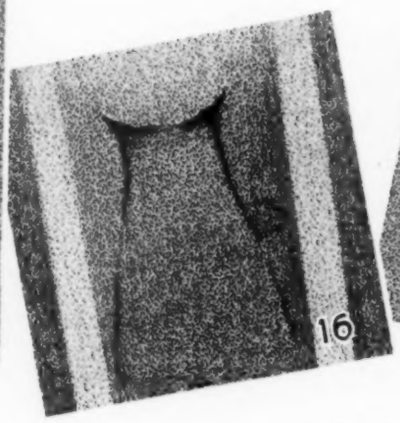


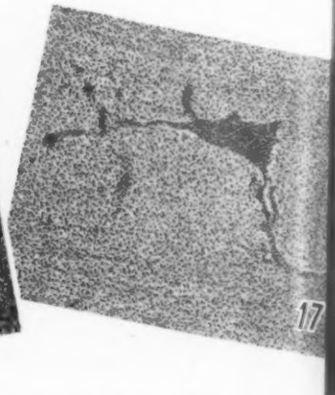




Irregularities in aircraft castings as shown by x-ray that may be corrected by foundry technique: Fig. 9—Gas holes. Fig. 10—Gas porosity. Fig. 11—Dross or slag. Fig. 12—Inclusions. Fig. 13—Cracks. Fig. 14—Segregations. Fig. 15—Misrun. Fig. 16—Cold shut. Fig. 17—Shrinkage cavity. Fig. 18—Shrink porosity. Fig. 19—Micro shrinkage Fig. 20—Centerline shrinkage. Fig. 21—Pipe. Fig. 22—Hot tears





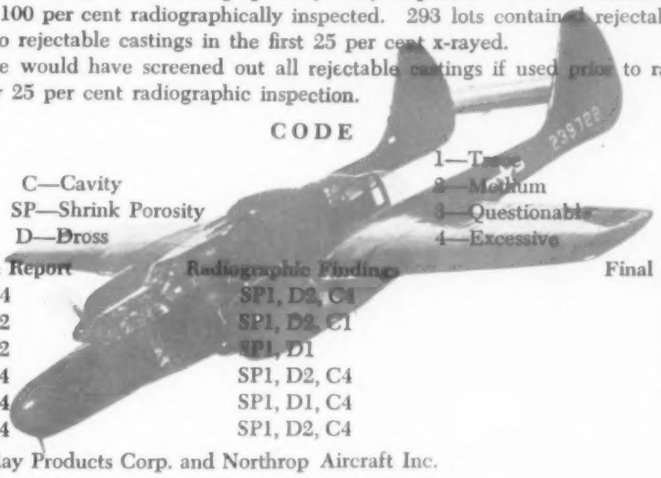


FLUOROSCOPIC VS. RADIOGRAPHIC X-RAY INSPECTION

33,777 castings (489 lots) were 25 per cent radiographically x-ray inspected. 155 lots contained rejectable castings. The same 489 lots of castings were 100 per cent radiographically inspected. 293 lots contained rejectable castings.

Conclusions: 1. 138 lots had no rejectable castings in the first 25 per cent x-rayed.

2. The fluoroscope would have screened out all rejectable castings if used prior to radiographic inspection, necessitating only 25 per cent radiographic inspection.



CODE

C—Cavity
SP—Shrink Porosity
D—Dross

1—T...
2—Medium
3—Questionable
4—Excessive

Fluoroscopic Report	Radiographic Findings	Final Disposition
1 — C4	SP1, D2, C1	Rej
4 — C2	SP1, D2, C1	O.K.
7 — C2	SP1, D1	O.K.
26 — C4	SP1, D2, C4	Rej.
19 — C4	SP1, D1, C4	Rej.
25 — C4	SP1, D2, C4	Rej.

Investigation Performed by X-Ray Products Corp. and Northrop Aircraft Inc.

The following table includes a comparison of costs at the present time:

The first cost column is the average radiographic cost per part with rejection cost included. The second column includes the combined cost of fluoroscopic and radiographic inspection cost.

Part No.	Average Radiographic Cost Per Part	Net Average Combined Cost Radiographic & Fluoroscopic	Net Saving Per Part
509017 Pulley Brkt.	$0.81	$0.59	$0.22
413375 Brkt. O.W.	1.24	.69	.55
413376 Brkt. O.W.	1.32	.83	.49
413377 Brkt. O.W.	1.33	.71	.62
414091 Rudder Pulley Brkt.	.49	.25	.24
517757 Heater Intake Scoop	1.00	.31	.69

When dross occurs in combination with gas it results in an irregular darkening within the image. Slag is usually of a regular shaped darkened spot or area.

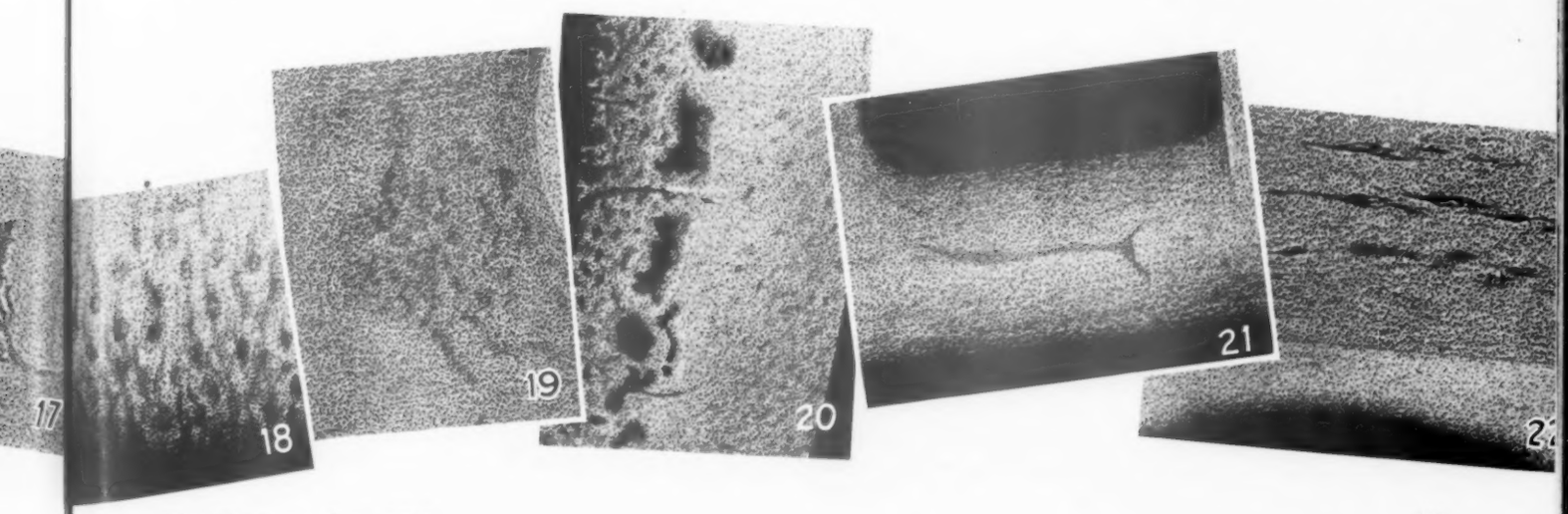
Inclusions (Fig. 12): Inclusions are foreign solid objects trapped in the casting. These will generally appear as light spots or areas on the radiograph.

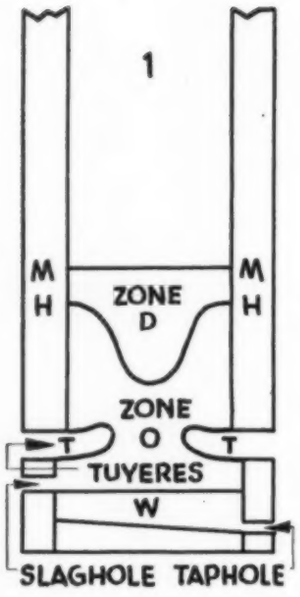
Cracks (Fig. 13): Cracks usually appear on the radiograph as single fine dark lines. A crack is caused by the fracture of solid material which may occur at any stage of production after the initial solidification of the casting.

Segregations (Fig. 14): Segregations usually appear on the radiograph as elongated dendritic or filamentary light patterns. These are caused by the segregation of metallic constituents from the parent metal. Where the segregation appears to be due to contraction stresses, an associated crack may be disguised by the segregation image.

Misrun (Fig. 15): A misrun appears on the radiograph as a dark area having a smooth outline of irregular dimensions. A misrun is the failure of molten metal to completely fill the cavity of the mold, leaving a void in the casting. Misruns are usually detectable by visual inspection of the casting.

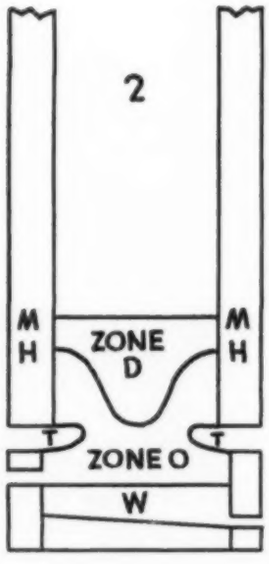
Cold Shut (Fig. 16): A cold shut appears on the radiograph as a smooth distinct line normally of variable density and less well defined than a (*Please turn to page* 222)

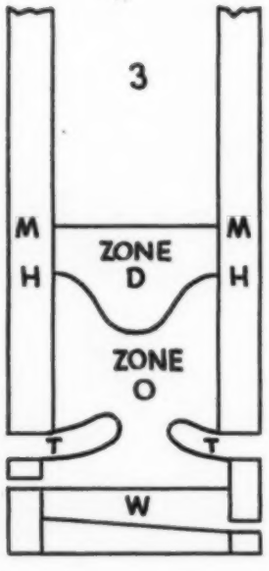




Consistent and economical production of cupola iron of the desired quality requires consideration of coke properties, cupola lining contour, blast volume and quality of melting materials, the author points out in this paper which was presented before the regional foundry conference of the Quad City Chapter, AFA

BASIC PRINCIPLES OF CUPOLA OPERATION





TO PRODUCE consistently iron of proper analysis and physical properties at desired temperature, and to accomplish this with the lowest cost for fuel, refractories and labor, involves consideration of four principal factors—properties of the coke, contour of the cupola lining, volume of the blast and quality of the melting materials.

Definite limitations are imposed by variable shop conditions, such as (1) insufficient height between the charging door and base plate, (2) necessity to force a cupola beyond its normal melting rate, (3) demand for higher or lower carbon may require a higher or lower bed height, respectively, (4) differences in combustibility of the coke used.

Such variations from shop to shop make it impossible to make comparisons of efficiency. For any given set of conditions there is a proper balance between the four factors; (1) properties of coke, (2) cupola contours and dimensions, (3) blast volume and (4) metal charge which will give clean, hot and consistent iron at the lowest cost possible for that particular foundry.

The writer, while a firm believer in quality melting materials, believes that cupola iron is truly made in the furnace more than is the case with any other type of melting device. It is important and absolutely necessary to establish a certain melting procedure and to follow it as closely as possible if consistent metal is to be obtained.

The diagram in Fig. 1 illustrates the portion of the cupola from bottom doors to above the melting zone. The stack portion of the cupola is filled with the metal, coke and flux in layers as it is charged. Air is blown in at the tuyeres reacting with the white hot coke to burn the carbon of the coke to carbon dioxide according to formula (a) $C + O_2 = CO_2 +$ heat. This reaction is accompanied by liberation of 14,550 Btu of heat for each pound of carbon burned and requires 2.66 lb of oxygen or 11.5 lb of air. This reaction takes place more or less rapidly depending on the size and quality of fuel and volume of blast.

The oval zone *T* represents the area in front of the tuyeres in which the cold air is being heated to a high enough temperature to support combustion, and the gases in this area are mostly heated air consisting of 23.1 per cent oxygen and the balance nitrogen. At some distance, which depends on the fuel and volume of blast, the air will have been sufficiently heated to support combustion and in zone *O* the (*Please turn to page* 298)

Fig. 1—Diagram illustrating portion of the cupola from bottom doors to above the melting zone

Fig. 2—Condition caused by low blast volume, small coke or highly combustible coke

Fig. 3—Condition caused by high blast volume, large coke or less combustible coke

By R. A. CLARK
Metallurgist
Electro Metallurgical Co.
Chicago

The Army Industrial College Looks at GRAY IRON

BECAUSE topside in the Army, Navy and War Production Board lacked understanding of the importance of gray iron as an engineering material, war production was hampered and the gray iron industry encountered serious difficulties during the war emergency. This conclusion was developed at a seminar on the Gray Iron Foundry Industry and Industrial Mobilization, staged recently in Washington by the Department of Research, Industrial College of the Armed Forces. The presiding officer was Brig. Gen. Donald Armstrong, commandant of the college, and the meeting was attended by Capt. E. R. Henning, USN, and Col. Robert W. Brown, USA, assistant commandants of the college. Other Army and Navy personnel present included representatives of the Army and Navy Munitions Board, Ordnance Department, Signal Corps, Naval Research Laboratory and Bureau of Ships.

BRIG. GEN. DONALD ARMSTRONG
Commandant
Industrial College of the Armed Forces
Washington

The industry was represented by A. C. Denison, Fulton Foundry & Machine Co., Cleveland; George W. Cannon, Campbell, Wyant & Cannon Foundry Co., Muskegon, Mich.; Edward C. Hoenicke, Eaton Mfg. Co., Detroit; Max Kuniansky, Lynchburg Foundry Co., Lynchburg, Va.; C. W. Bonbright, General Foundry & Mfg. Co., Flint, Mich.; L. J. Wischerath, Buflovak Equipment Division, Blaw-Knox Co., Buffalo; J. O. Jackson, Jackson Industries Inc., Birmingham; A. E. Hageboeck, Frank Foundries Corp., Moline, Ill.; Herman P. Good, Textile Machine Works, Reading, Pa.; A. J. Edgar and W. M. Caldwell, Gray Iron Founders' Society, Washington; Donald J. Reese, International Nickel Co., New York, and Frank G. Steinebach, THE FOUNDRY, Cleveland.

Representatives of the following other government agencies were present: Civilian Production Administration, Department of Commerce, Tariff Commission, Bureau of Mines and Treasury Department.

General Armstrong pointed out that the meeting was organized to find out what gray iron foundrymen consider were the deficiencies in the use of gray iron castings by the Army and Navy during the war, to ascertain the present trends in that industry and, to the extent possible, to determine what recommendation gray iron foundrymen would like to put into the record which will make more effective the use of the industry if the nation has to call on it again. The discussion was very informal, and because of excellent handling on the part of the chairman, much interesting information was developed.

A lengthy discussion centered around the difficulties of the gray iron industry during the war. Many of those participating in the discussion stressed the lack of knowledge of gray iron as an engineering material. That lack of knowledge was present in 1941 and 1942 and a portion of 1943. At the beginning of that period the gray iron foundry industry employed about 200,000 to 250,000 people, but with a lack of orders, employees were lost to other industries. When gray iron at last was recognized for what it is, the manpower problem became very real.

In too many cases, the officials in charge of pro- (*Please turn to page* 278)

Gray Iron Foundry Conditioning

By C. W. SCHWENN
Plant Superintendent
Brillion Iron Works Inc.
Brillion, Wis.

Conditioning a plant to improve working conditions, production and quality of castings need not be expensive. In this paper, presented before the annual meeting of the Gray Iron Founders' Society, the author details the cost and savings derived from various improvements made at his foundry

WHAT do we mean by "Plant Conditioning?" Why not start where both the customer and the prospective employee get their first impression—outside plant appearance. If the plant looks run down, badly in need of paint, window panes broken, flask yard untidy, grass, or perhaps weeds, not cut, surely there will be a big question in the mind of the customer as to the quality of the product he will receive.

Likewise, the prospective employee may not even bother to stop at the employment office, but rather drive on down the street to the neat, clean, well painted, beautifully landscaped plant of our competitor—yes, our competitor; not a competitor for our castings perhaps, but surely a competitor for our labor.

Now suppose, through fine outside plant appearance, plus a good personnel man, we have enticed the prospective employee into the plant. We take him on a tour of the shop. As we step through the foundry door, we enter a poorly lighted room; dust and slag hang from the overhead structures; the sunlight tries to penetrate through several layers of dust and oxide on the windows. After plowing through an inch or two of dust and dirt in the gangway, being careful not to trip over clamps and gaggers or skin our shins on patterns or flasks that should have been in storage days before, we finally complete our little tour.

Create Favorable Impression in Spectator's Mind

What happens to our prospect? More than likely he has decided the foundry is no place for him, so he goes elsewhere for employment. Now, suppose instead, we bring him into a clean, well lighted, well ventilated, orderly room, with windows bright and clean, walls and ceiling painted, gangway swept, neat molds arranged in straight rows and the molders whistling and joking while they work. What a different impression he will have of the foundry. Our chance of hiring the prospect certainly would be greatly improved.

Suppose then, we have been fortunate enough to hire the prospect. We have already gone a long way towards making his job desirable, but there is a lot more "Plant Conditioning" needed before we have a satisfied employee.

If we are to maintain a high level of employment in our industry, we must do

everything in our power to make the jobs in our plants more desirable. Making our jobs more desirable does not necessitate the expenditure of large sums of money with little, or no, returns. First, let us enumerate some of the advantages of "Plant Conditioning' which are, perhaps, difficult to measure in dollars and cents, but most certainly are created when we have accomplished our goal.

We will surely attract a high grade of labor, instead of the castoffs we would be forced to employ if our working conditions were poor. With a better type of labor we will be able to operate our plant more efficiently.

Improve working conditions, and we will have a marked decrease in both absenteeism and labor turnover. The employee who is happy in his work is apt to be on the job every day and will do better work—and more of it. He will stick with his job and more than likely be a booster for the company, thereby helping to attract more worthy employees.

One of the biggest problems confronting management today is labor relations. If we are to have good labor relations, we must have good job conditions. Discontent breeds in the mind of the worker who feels that management is not doing its part to make his job more desirable. Show this worker that sincere effort is being made to make his job easier and improve his working conditions, and more than likely he will not be a trouble maker.

Now let us speak of some of the more tangible savings that will accrue through better plant conditions. First and foremost, we should experience an increase in production. The contented workman, with good working conditions and modern, up-to-date tools and equipment, is going to be an efficient workman who will produce a large quantity of work. The quality of his work will be higher, and the scrap loss and machine shop re-

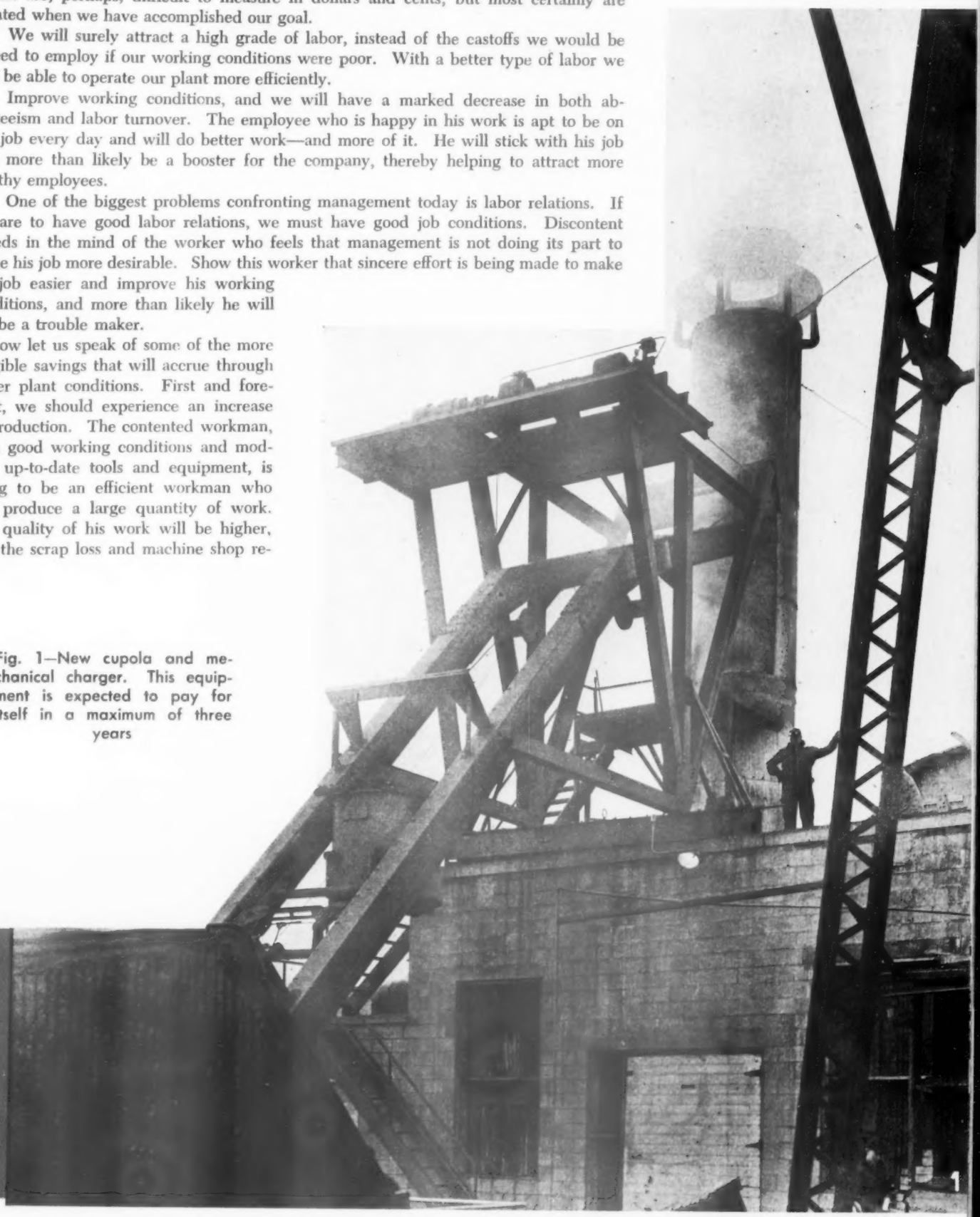


Fig. 1—New cupola and mechanical charger. This equipment is expected to pay for itself in a maximum of three years

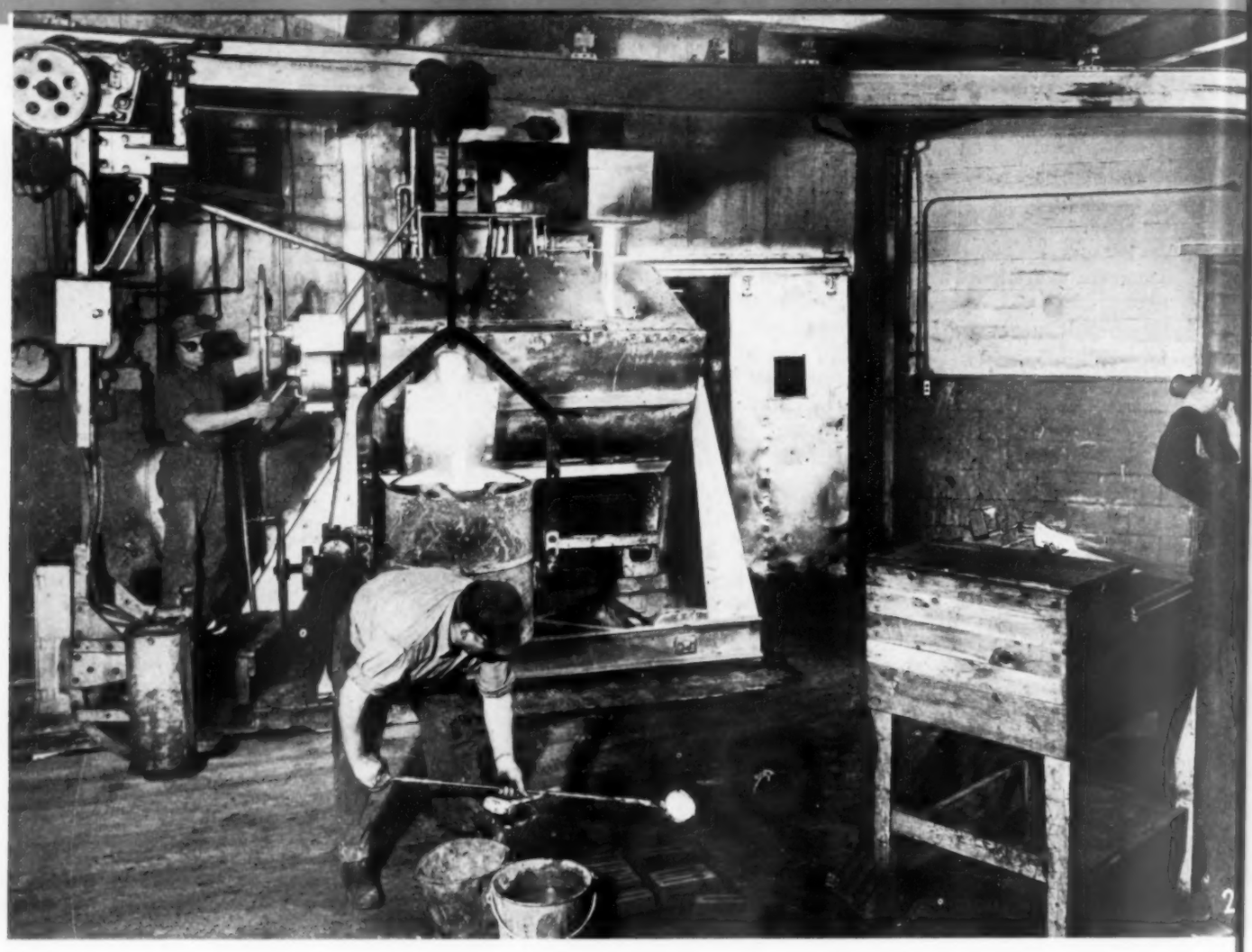


Fig. 2—Front view of cupola. Working conditions around the cupola were improved by installation of an inexpensive, homemade hydraulic slag disposal system

Fig. 3—Plant conditioning could well start with the foundry's outside appearance

Fig. 4—High-lift industrial truck, used primarily to haul castings to cleaning room and core sand to coreroom, also is useful for handling cores, slag, etc.

Fig. 5—Proper lighting in cleaning room helps both workers and work quality

jects lower. Workers pattern their attitudes and habits after shop appearance, and the old saying that "the clothes oft' proclaim the man" has a sequel in the statement that a "clean, orderly plant oft' proclaims the product of that plant."

We all know that accidents cost a lot of money, not only in doctor bills and compensation, but through losses in production. The accident frequency and accident severity will be low in the foundry that has been thoroughly conditioned.

It may be helpful to enumerate some of the improvements that we have made in our plant in the last few years, giving the approximate cost of such improvements and the benefits derived therefrom.

Our work is confined to small and medium weight castings, the largest production casting weighing about 300 lb. We do not have a highly mechanized shop. With one or two exceptions, the molders shovel their sand and set the molds out on the floor to be poured. We believe that perhaps a further savings could be made with hoppered sand and mold conveyors, but we have not seen fit to go into this program as yet. The plant conditioning we will discuss here can be done in practically any size or type of foundry with very little expense and big returns.

Control System Checks Man-Hour Requirements

We maintain in our plant an hours-control system that gives us daily the man-hours per ton of good castings in every department in the plant. This hours control record was established in 1941. We feel that we have concrete evidence of the saving made by our plant conditioning program.

One of the most important improvements made was in ventilation. Previous attempts had been made to get proper ventilation in the foundry and coreroom, but conditions prevailing until the present system was installed were far from satisfactory. While pouring and shaking out, the gas and dust was extreme. This condition, of course, caused lower production and high labor turnover; in fact, it was extremely difficult to get sufficient help to pour, shift, and do shakeout work.

This problem was solved in the foundry by the installation of eight 42-in. ventilators, each costing about $400. Several portable man cooler fans were also put into use to provide a greater movement of air in places where the heat was extreme due to pouring. This improvement in ventilation was, we feel, the main contributing factor to the decrease of 4 man-hours per ton of good castings in the molding department. Moreover, we have been able to maintain a high level of employment on our pouring and shakeout crew, thereby eliminating the necessity of having men from other departments help do this work.

Next, we inaugurated a good housekeeping program. This was no short cleanup campaign, but a continuous program whereby the entire plant was cleaned and painted; and steps were taken to insure its being kept in that condition. To maintain a clean and orderly plant, we find it necessary to have only three full-time and one part-time sweepers or cleaners. On these jobs we have the older type employee who is more or less physically unable to do the more difficult laboring jobs. We find supervision will not attempt to steal this type of worker away from the cleaning job in case there is some labor shortage in their department.

We have a large vacuum cleaner for use on the walls and ceiling, as well as on the floors in some departments. We find that periodical cleaning of walls and ceiling in each department will eliminate the necessity of frequent painting. Dust accumulates, to be sure, but it is removed rather easily if not allowed to remain too long.

Mercury vapor lighting has been installed in both foundry and core room, giving us a maintained foot candle reading of 35 in the foundry and 45 in the core room. Fluorescent lights in the cleaning room provide 35 foot candles in that department. This cleaning and painting program, together with the new lighting, have brought many favorable comments from employees, as well as customers and visitors.

The installation of a homemade hydraulic slag disposal system, at a cost of $300, eliminated the hard, hot job of cleaning up slag, as well as improving the working conditions of the cupola tender and charging crew. This system uses very little water, and has made a saving of 3½ man-hours per day.

Several pieces of labor-saving equipment contributed to a substantial lowering of man-hours per ton. One of the most important was a high lift truck tractor. This machine, contrary to the opinion of some, does not require a big, wide gangway in order to operate efficiently, but can be operated and maneuvered in a very small space. We

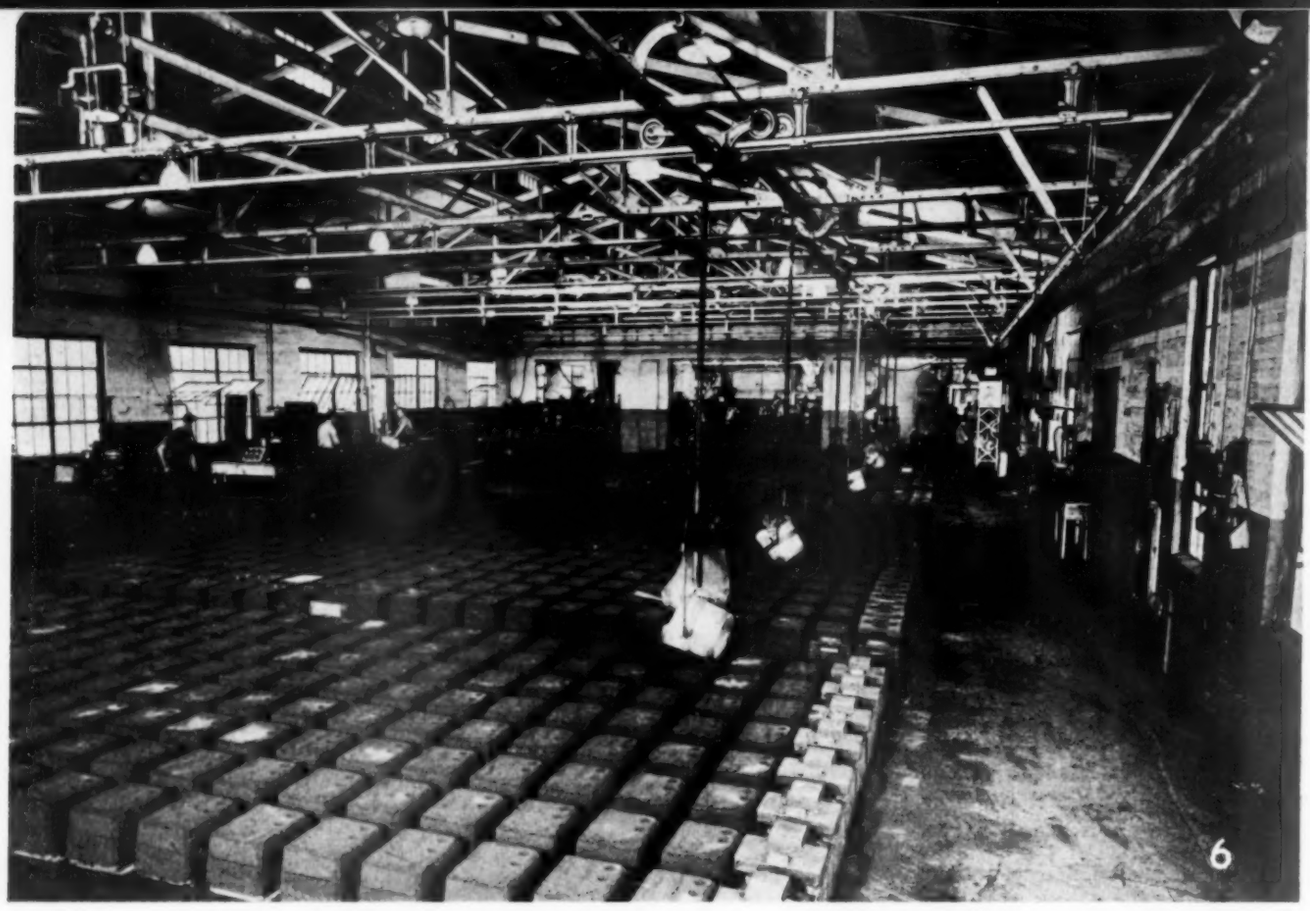


Fig. 6—Main molding bay of the foundry reflects results of continuous good housekeeping program

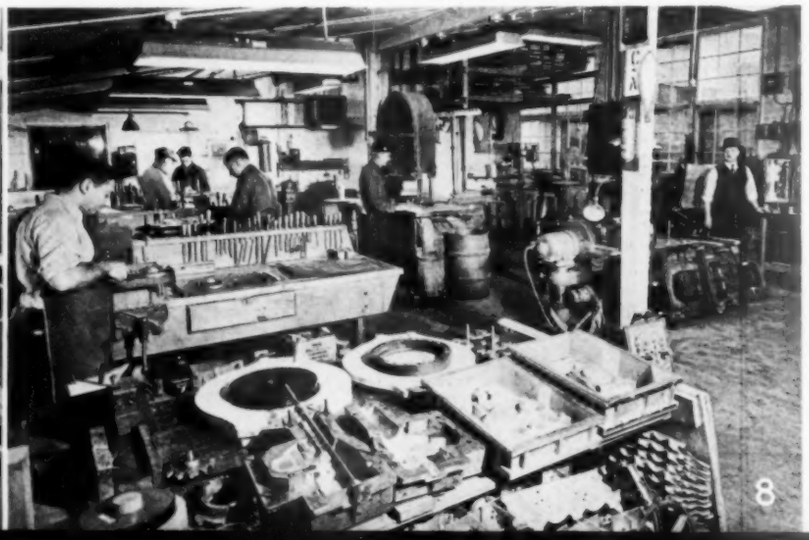
pour 55 to 60 tons of iron daily, and use 30 tons of core sand daily, and with one tractor all of the iron is hauled to the cleaning room, and all the core sand is trucked to the coreroom. Besides this work, the "jeep," as the boys call it, finds time to do other miscellaneous jobs, such as haul cores, facing sand, slag, etc. The cost of this piece of equipment was $3400, and in the three years it has been in use it has saved several times its initial cost and its maintenance cost.

Two other pieces of labor-saving equipment that have contributed to a saving of 2½ man-hours per ton on the shakeout are a small powered shovel and a portable shakeout screen. The shovel is used to put the sand in windrows ready for the sand-cutter, one man doing the work that five men did previously. It also loads sand in dump buckets to be hauled to the facing muller by the "jeep," as well as unloading all the sand from the box cars. I don't know how we would get the job done without this $2300 machine.

We make a considerable number of air-cooled cylinders in dry sand which have always presented a bad gas problem while pouring and shaking out. A low building, only 5 ft high, 15 ft wide and 70 ft long, with four rows of roller conveyor and one 42-in ventilator fan, has enabled us to store, pour and shake out 500 to 600 cylinders daily, with practically no gas escaping into the coreroom. An intolerable gas condition was thereby remedied at a cost of only $5000. These air-cooled cylinders are now assembled on a roller assembly line, with a large saving of space as well as a saving of 3 man-hours per hundred cylinders.

Through the broader use of coreblowers a substantial saving in man-hours has been made in the coreroom. Transferring jobs to the core- (*Please turn to page* 260)

Fig. 7—Making, assembling and pouring air-cooled cylinder cores. Fig. 8—View of pattern shop



By WILFRED H. WHITE
Metallurgist
Jackson Iron & Steel Co.
Jackson, O.

CARBON in Pig Iron

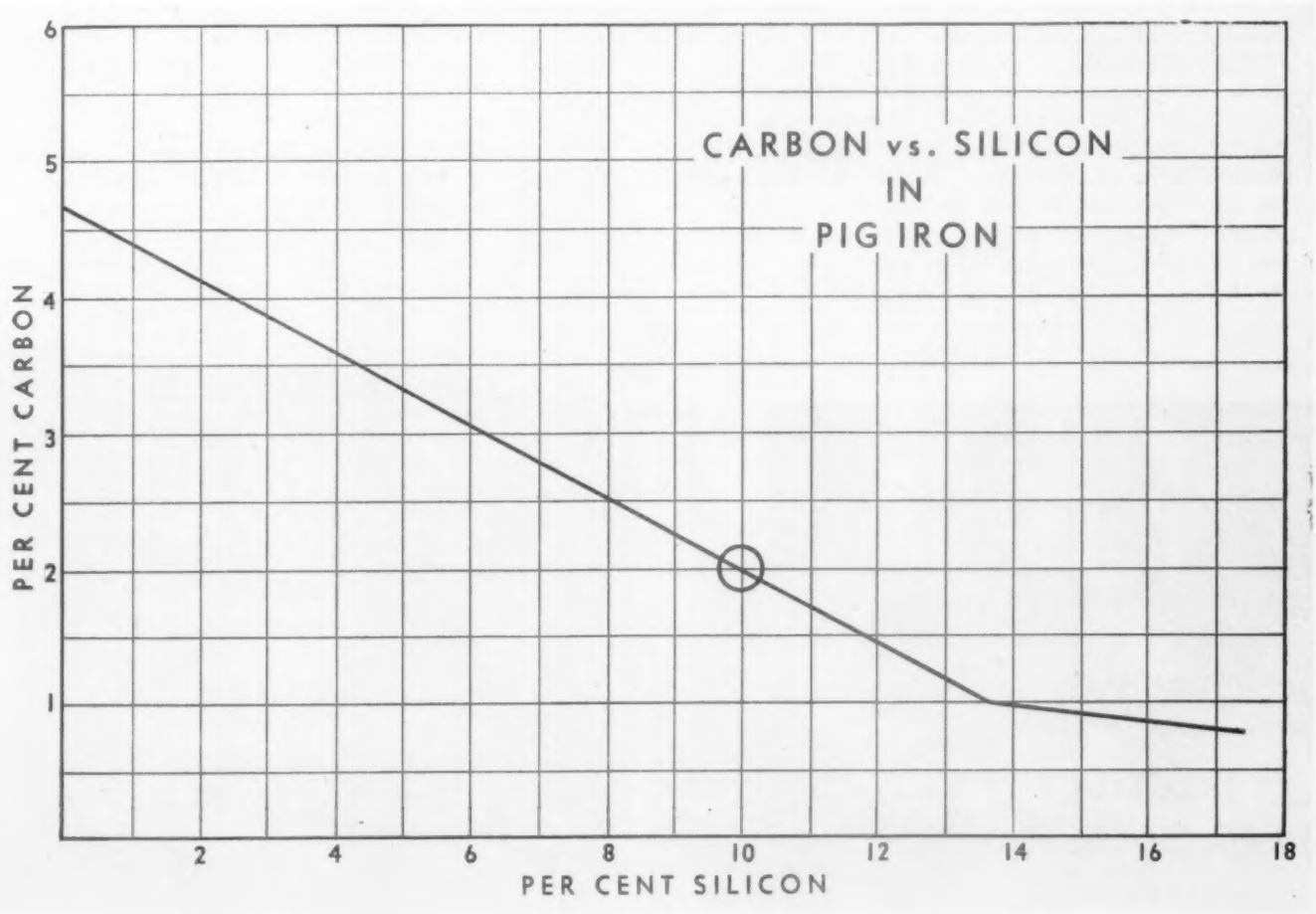
SINCE pig iron is shipped on the basis of silicon, manganese, phosphorus and sulphur content but not on carbon content, most foundries have to analyze each car of iron if close carbon control is necessary in their heats.

This company compiled some data of carbon, silicon and manganese contents on various grades of merchant pig iron. These grades included our own high silicon iron as well as the lower silicon grades from other blast furnaces. It was found that there is a very definite relationship between silicon content and the carbon content of all pig iron produced in the blast furnace. This is due to the fact that a condition of saturation exists, the excess carbon being eliminated as "kish" during solidification and cooling. The manganese content between 1 per cent and 3 per cent appeared to have little or no bearing on this relationship.

Upon plotting these points, only slight deviations were found from a straight line until the silicon content approached 14 per cent, when an abrupt change in direction was observed. The change at this point is probably due to a change in the relation of silicon to iron at this concentration. It is interesting to note that this curve is above the eutectic line (*Alloys of Iron and Silicon*, page 175, Greiner, Marsh and Stoughton) but approximately parallel to it.

Since the sampling and analysis of ferrous materials containing large amounts of graphitic carbon, is the most difficult of the common elements, it was felt that such a chart, once established, would be more accurate than any single determination for carbon content. The writer has used this chart with excellent results in making up charges for foundries, especially when the silicon content was available but not the carbon content of pig iron produced by blast furnaces other than our own.

So much interest has been shown in the subject by many metallurgists and foundrymen that the chart is presented here.



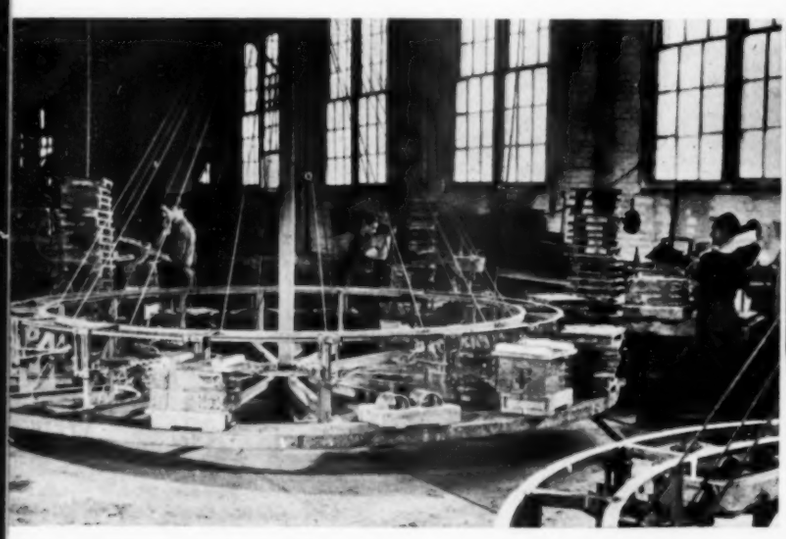
MECHANIZED CASTING OF *Soil pipe and*

By PAT DWYER
Engineering Editor
THE FOUNDRY

OPERATION of the foundry of Warden-King Ltd., subsidiary of Crane Co. Ltd., Montreal, is devoted to the production of five main casting classifications: Soil pipe in standard straight lengths and in diameter from 2 to 12 in.; soil pipe fittings; miscellaneous general jobbing castings; boiler sections; and radiator castings. A notable item in the general jobbing section is a 4-ton high-pressure cylinder for a triple-expansion marine type engine. Approximately 300 of these castings have been delivered to an outside interest since Canada commenced building ships on a war program.

The mold for this casting is green sand inside an iron flask. A considerable part of the outside wall, brackets, pockets, etc., and of course the entire inside are formed by dry sand cores. Metal enters the mold through step gates on one of the vertical flanges and, with the exception of a few showup pop gates on top, the casting has no risers. Cupola charge for the cylinder castings carries 55 per cent steel. The highly skilled molder who turns these castings out with unfailing regularity is one of the few remaining members of a group that "Could make anything the crane could lift, either in a flask, or in a pit in the floor!"

Exceptionally close control is exercised over the three sand preparation units from which sand is delivered by belt and paddle conveyors to the various molding stations. Base sand is a washed silica sand bonded with bentonite and showing the following physical properties: Grain size 90, permeability 85, moisture 5 to 6 per cent, green compression 7 to 9 lb, dry compression 85. Moisture is slightly lower on boiler section and radiator floors. Seacoal to the extent of 4 to 5 per cent is added to insure a clean, smooth skin on the castings. Underground belts and paddle chain conveyor carry the sand from the shakeout stations to the storage hoppers which discharge measured amounts into the mold. The sand laboratory is equipped with all the necessary apparatus for testing sand samples regularly. The coreroom at the opposite end of the shop from the main production units has its own sand preparation plant. A limited amount of old sand is incorporated in the large,



fittings

Fig. 1—Molds from several stations placed on revolving tables are poured as they pass a certain point and then are shaken out over a grating in the floor

Fig. 2—Core barrels returning from the shakeout pass through a water spray before they are placed in the coremaking device

Fig. 3—As the molds reach the end of the conveyor line they are shaken out on a vibrating machine.

Fig. 4—Device clamps flask and holds down plate on cope

chunky cores, but the smaller cores, the radiator cores and the boiler section cores are made from new silica sand bonded with oil.

Although not all exactly the same length or width, the general floor plan of the foundry shows five parallel and longitudinal areas, each one devoted to the production of a definite line of castings as outlined in a preceding paragraph. Ample gangways between the units are maintained in a clean and orderly condition, an important feature in the general good housekeeping program observed and enforced all through the plant, amply day-lighted, heated and ventilated according to modern standards of efficiency. Further improvements, part of an extensive program, are in progress.

Molds for soil pipe fittings in almost infinite variety are made on a battery of squeezer type molding machines and poured on a number of revolving tables, each table adapted to receive the output of several machines. In a carefully worked out program, 1000-lb ladles suspended from a monorail arrive at the turntables in orderly succession and the metal is poured into the molds. Before the molds complete another revolution they are dumped over the side. The sand falls through a grating onto a reciprocating conveyor leading to the sand preparation plant; the castings are loaded in trucks and taken to the cleaning room where they are packed in tumbling barrels; the flasks are returned to the molding stations.

Green sand cores exclusively are placed in the molds for soil pipe and soil pipe fittings. Straight lengths, to be considered later, are swept on seamless steel tube arbors, while the cores for the connections, bends, elbows, Ts, Ys, crosses, etc., are made according to two methods. In the first, or *A* method, the pattern serves to make mold and core at the same time. In the second or *B* method the core is made independently and placed in the mold after the pattern has been removed.

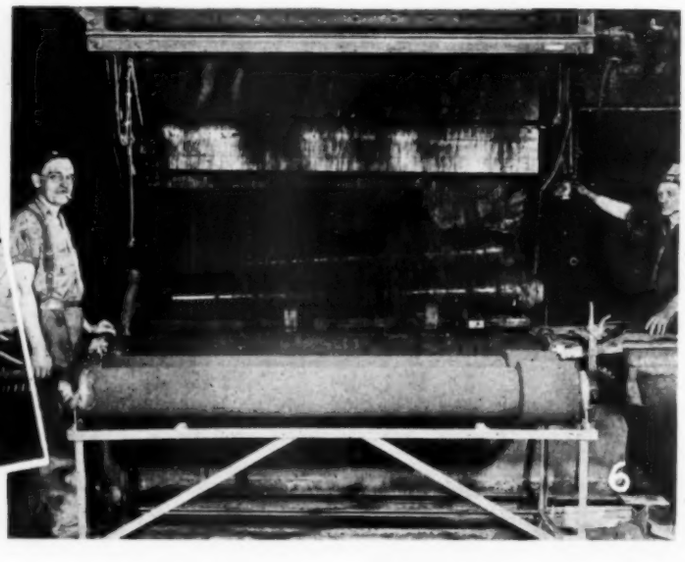
The first method (*A*) is subject to further subdivision. In *A*1 the core is lifted out of the mold to permit removal of the drag half of the pattern. Then the core is returned to place. In *A*2 the mold is rolled over twice and the core is not moved from its position at any stage of the process. The cast iron pattern for either *A*1 or *A*2 is an exact replica of the desired casting, with the exception that it is split longitudinally through the center, is provided with dowel pins, is highly finished and is slightly larger than the proposed casting to compensate for the anticipated shrinkage.

In the *A*1 method the drag half of the pattern is placed on a follow-board and the drag is rammed and rolled over in the usual manner. A small quantity of sand is placed inside the half pattern and the cast iron arbor is pressed down into place. The second half of the pattern is adjusted, after which sand is packed into the pattern by hand through the end openings. The cope is rammed and lifted off. The top half of the pattern is removed. The core is lifted out and placed temporarily on a convenient sand. The drag half of the pattern is removed and the mold is reassembled.

In method *A*2, drag, core and cope are rammed as in the preceding instance. Then the entire mold is rolled over so that the cope rests on the bench. The drag is lifted off and the drag half of the pattern is removed from the core. Then the drag is replaced and the entire mold is rolled back to its original position. The cope is lifted off and the cope half of the pattern is removed. The cope then is replaced. Adoption of either method depends almost entirely on the shape and size of the castings. Method *A* is particularly adapted (*Please turn to page* 246)

Fig. 5—Instead of hanging in the open, constituting a potential menace to employees in the vicinity, the counterweights connected to the molding machine heads are enclosed in sheet columns

Fig. 6—A stream of sand descending from a hopper falls upon two barrels to form two complete green sand cores for standard soil pipe sections

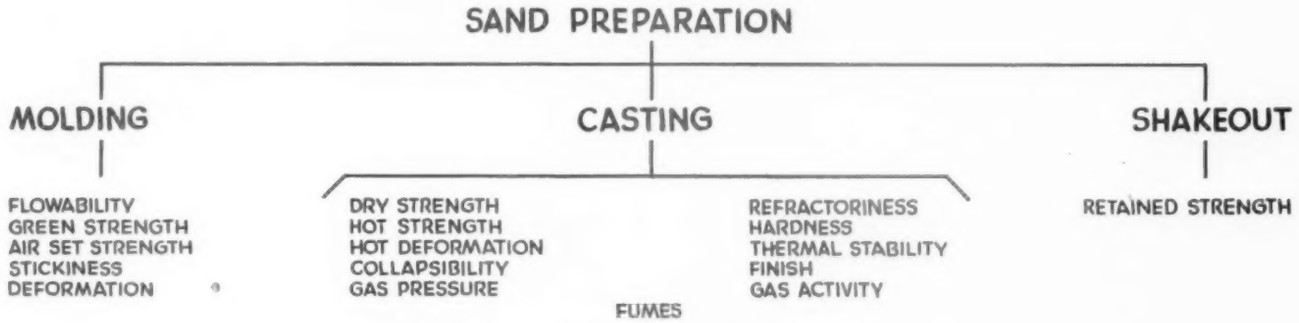


By HARRY W. DIETERT
Harry W. Dietert Co., Detroit

Foundry Sand Control Plan

BOTH molding and core sands should be prepared to serve a threefold purpose. First, one is interested in having a sand that the molders or coremakers can easily ram and in obtaining a mold or core which can be handled as conditions in the foundry dictate. Second, one is interested in having a sand prepared so that it will form as near a perfect container of molten metal as possible producing a high grade casting. Third, one is interested in preparing a molding or core sand which will shake out easily.

The diagram shown below may be used to examplify the thought of sand preparation for the above threefold purpose.



In preparing sand first to meet these various requirements, one has a large group of conditions to meet which make sand control a problem that takes considerable study. To save time, the following outline will be found useful.

I. SAND PREPARATION FOR MOLDING REQUIREMENTS

A. Prepare the sand to meet the molding requirements:
1. Lifting ability
2. Ease of ramming
3. Lack of sponginess
4. Lack of stickiness to secure clean lift
5. Lack of sagging tendency
6. Green strength to be standardized
7. Firm air dried edges
8. Near room temperature as possible
9. Toughness to avoid drops and allow for crush
   a. Green strength
   b. Green deformation
10. Uniformity of composition and texture
11. Toolability

B. Molding the sand.
1. Fill the flask or core box to secure
   a. Same volume of sand each time
   b. Same sand introduction into flask or box
   c. Same sand compactness throughout flask or box before ramming
2. Ram the sand
   a. Identical method
   b. Uniformity or of a consistent pattern in hardness
   c. Control mold and core hardness with diligence

II. SAND PREPARATION FOR CASTING REQUIREMENTS

C. Prepare the sand to meet the casting requirements:
1. Produce the required casting finish
   a. Use smallest permissible grain fineness
      (1) Avoid excessive coarse grains
      (2) Use 75 per cent grain distributed on 3 adjacent sieves
      (3) Eliminate sand balls
   b. Use highest flowability obtainable
      (1) Limit clay substance
      (2) Limit sand toughness
      (3) Consider ramming energy available
      (4) Control moisture content
      (5) Eliminate sand balls
      (6) Consider mold depth and volume
   c. Prepare sand within selected hot strength range.
      (1) Moisture content controlled within specified range.
      (2) Standardize on quality and quantity of bonds
      (3) Hold fines (200, 270 and pan) to definite percentage
      (4) Ram to uniform standardized hardness
      (5) Controlled rate of collapsibility
   d. Resistance to spalling
      (1) Provide cushioning voids
         (a) Addition of combustible materials, cereal, sea-coal, wood flour, pitch, bran, etc.
         (b) Retard flowability by increasing coarseness of grain, or sand toughness
         (c) Ram softer
         (d) Protective coatings
         (e) Drying
         (f) Control a selected bond
   e. Refractoriness
      (1) Control amount of glazing with sintering point control or with a dilatometer glaze test
2. Produce the required gas
   a. Gas pressure
      (1) Control moisture
      (2) Permeability to be controlled
      (3) Standardize on addition of volatile and combustible materials
      (4) Standardize on mold depths
   b. Gas activity
      (1) Chemical composition of gas to be mated to metal composition

III. SAND PREPARATION FOR SHAKEOUT REQUIREMENTS

D. Prepare the sand to meet shakeout requirements.
1. Produce a core or mold section that will shake out easily.
   a. Control retained strength within a specified range
   b. Use largest grain size permissible
   c. Use large vents
   d. Allow cores to be subjected to heat as long as possible
   e. Allow maximum amount of air to enter core while hot
   f. Use quick collapsing binder as selected by retained strength test. 800 F. for 30 minutes soak, own atmosphere is suggested

By JAMES McELGIN
Manager, Foundry Department
E. F. Houghton & Co.
Philadelphia

BAKING CORES *Dielectrically*

DIELECTRIC baking of cores—a new development which offers possibilities of markedly speeding up production in the coreroom—comprises a high frequency electronic method of heating which permits the extremely rapid curing of cores made with resin-type dry binders. With baking time by this process reduced to a matter of seconds or a few minutes, it is possible to adapt the method to mechanization, placing green cores on a conveyor, passing them through a heating chamber between two electrodes at a predetermined speed according to mass of the core, and taking them off at the other end ready for use.

The electronic principle now is being applied in the coreroom—curing resin-binder cores in a few minutes by the equipment described here

Dielectric heating results from the electrical stress set up in core molecules when current is reversed 20 million times per second between two electrodes. Heat is distributed uniformly throughout the mass of the core which is placed in this high frequency field. A generator is used to transform 220 v into 6000 v, which are converted into radio-frequency power of 20 megacycles. Compare that with the ordinary light current frequency of 60 cycles per minute, and an idea can be obtained of the swift reversing of current, creating heat.

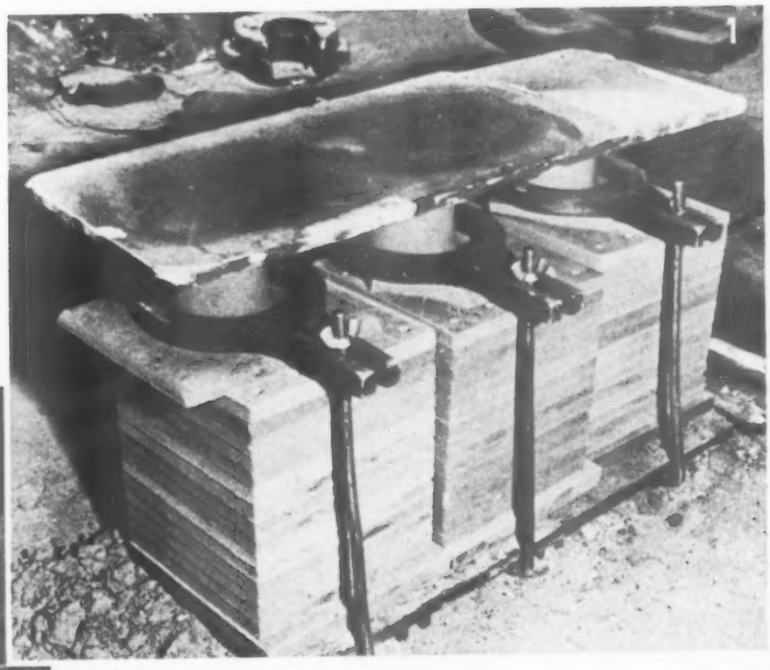
In contrasting this heating system to conventional oven baking, it is first necessary to consider the differences between the two methods. Sand cores are poor conductors of heat, and when placed in an oven on racks the heat penetrates slowly from the outer surface into the core interior. Thick cores require more time than thin sections to bake. When cores have thick and thin sections there is a danger of burning or overbaking the thin part while allowing time for thicker sections to bake through. Hot spots may occur in the core oven unless burners are properly spaced and circulation of air is

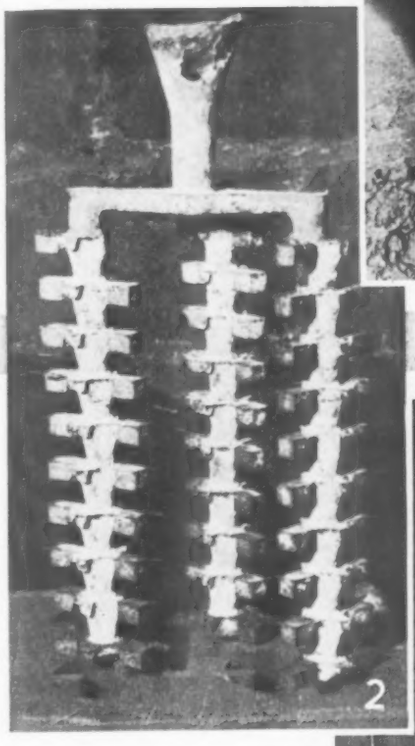
Fig. 1—Cores which have been baked dielectrically are shown piled up and clamped ready for pouring. No flask is used

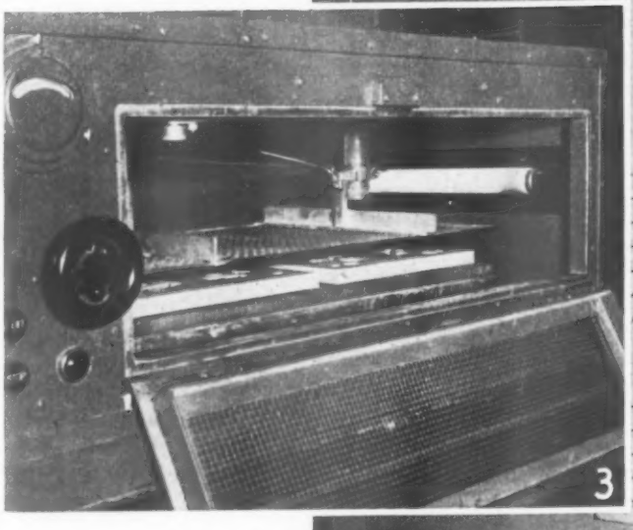
Fig. 2—Castings removed from the cores. These are magnet bars which were knocked off the main stems and then machined

Fig. 3—Close-up view of dielectric baking chamber showing cores in position between the two electrodes. Fluorescent tube lights oven. This oven was used in development work before conveyor handling was installed

Fig. 4—Generator and dielectric oven. Generator transforms 220-v current to 6000 v with low amperage, producing frequency of 20 million cycles







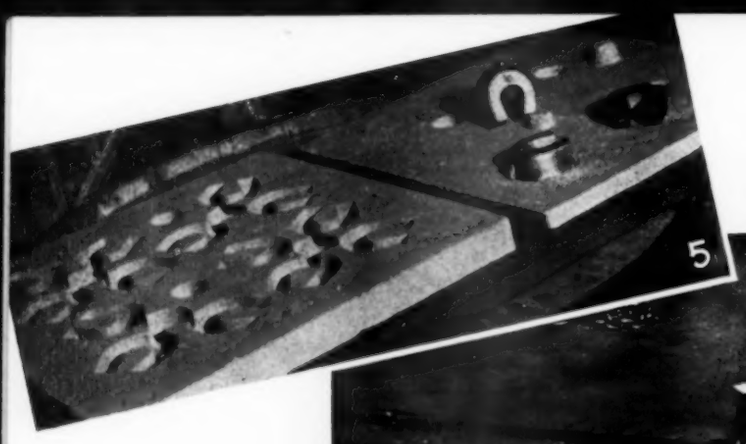


Fig. 5—Types of cores used during development work on the process. These are now made on a production basis. Castings produced from the cores are shown at right

Fig. 6—Dry sand molds after pouring. Note hot strength

Fig. 7—Other samples of cores employed in development of dielectric core baking practice

provided to distribute heat uniformly throughout.

In the dielectric heating method, cores are placed on a slab which is laid on the conveyor (or if not a mechanized installation on the lower electrode). The door of the oven is closed and the heat is turned on. In from 10 seconds to 10 minutes, depending on thickness and bulk of the core, the baking is completed and the core is ready for use. It can be handled almost immediately.

Thus far the comparison has been between oven and dielectric baking. To get a further picture of the reasons why such speedy baking can be accomplished by this new process, it is necessary to point out the difference between types of sand binders.

At the outset of the preliminary co-operative research devoted to this whole subject by E. F. Houghton & Co., manufacturer of core binders, and Induction Heating Corp., maker of Ther-Monic heating equipment, it was recognized that oil type binders would be slower to cure than would the newer dry binders based on the curing of synthetic resins. With the latter type it is only necessary to drive off all moisture. The resin cures almost immediately under high heat, due to its thermo-setting property.

On the other hand, oil-type binders—long used for coremaking, cure by oxidation or polymerization of the oil, a slower time-temperature reaction. It takes a longer time to drive off the moisture and raise the temperature of the oil-sand mix to the point where the oil is polymerized or oxidized. However, recent developments in polymerized core oils have resulted in reduction of that time.

The old rule was that oil-sand cores had to be baked one hour for each inch of core thickness. Heating is from the outside in towards the center. In contrast, the dielectric method of heating hardens the interior first, because of radiation losses on the exterior. Of course, the heat application is uniform throughout. Thermo-setting resins cure so rapidly that the time element can be disregarded. The residual heat remaining in the core finishes the reaction after moisture is driven off.

Therefore, although heating of oil-sand cores by the dielectric method is quicker than by conventional oven method, such cores require much more time than do cores made with resin-type binders.

As an example, standard tensile strength core specimens used in testing and having 1 sq in. cross section, are baked out in 30 *seconds* by the dielectric method. Danger of burning or underbaking by dielectric heating can be obviated by setting the conveyor at the proper speed to provide just the right amount of heat needed to assure proper curing.

No preheating is needed, as electric heat is instantaneous. The units consume no power when not in operation on actual baking work. These units thus lend themselves admirably to short production runs of identical cores which may be needed in a hurry.

There is a minimum of gassing or odor from thermo-setting resin binders when baked. (*Please turn to page* 288)

In this second of two articles discussing ***shakeout ventilation*** *the author describes the down-draft,* ***double canopy hood*** *and totally enclosed* ***shakeout types***

Ventilating THE MOLD SHAKEOUT

By C. C. HERMANN
Whiting Corp.
Harvey, Ill.

IN THE first part of this discussion—published in the April, 1946, issue of THE FOUNDRY—the design and operation of the canopy hood for ventilating the shakeout were described in considerable detail. In the present article we will go into design detail of the down-draft type of ventilation, the double canopy hood and the totally enclosed shakeout.

Down-draft ventilation of the shakeout is very desirable in that all possible obstruction to handling of the flasks to the shakeout, the removal of castings and removal of the flasks is eliminated. Crane travel is unrestricted and the workmen have full freedom of movement about the operation. The maintenance of overhead hoods is not a small matter and although designed for rugged construction, eventual damage by collision with objects carried by cranes will necessitate frequent repairs.

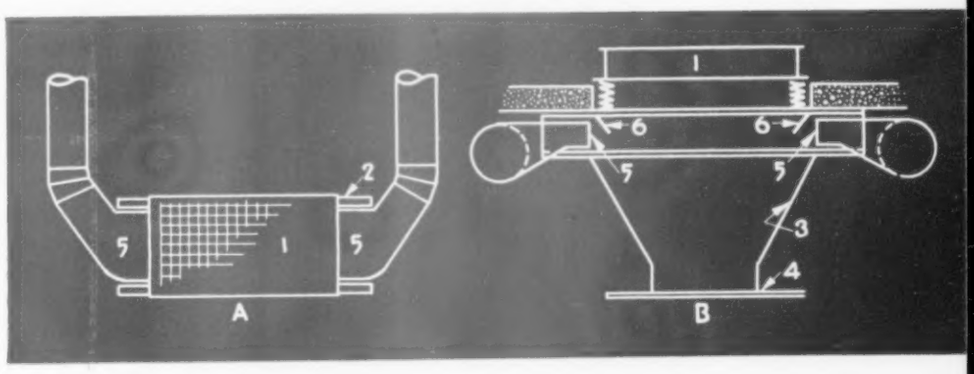


Fig. 5—Plan and elevation of typical method of applying down-draft ventilation

Many down-draft types of shakeouts were installed before one finally was designed which adequately would handle the problem. As pointed out in the previous article in referring to this type of ventilation, the secret, if it may be called so, lies in maintaining ample area of the shakeout open at all times to permit the air for ventilation to reach the exhaust chamber. The solution lies in sizing the shakeout liberally with respect to the size of the mold so that even with the mold and its sand heaped up over the shakeout for a few seconds or a few minutes, the ventilation features are not nullified.

A typical method adapted to the thorough ventilation of the down-draft shakeout, is shown in Fig. 5. *A* is a plan view and *B* is an elevation. Numbered parts refer to the same element in both views. The shakeout machine is shown at 1, located on the foundation members 2, which in turn are encased in the floor or foundation on which the shakeout rests. The sand hopper under the shakeout is shown at 3 and the conveyor at 4.

In many designs of this type a single air duct has been placed beneath the floor and extending along one side or end only of the shakeout. In others attempts have been made to save installation expense by connecting to the hopper below the shakeout by a single round or flattened duct directly over the conveyor and running this air duct along perhaps one side of the conveyor to a place of exit. The trouble with the first method is that ventilation to all parts of the shakeout, except one side or end, are blocked off by the volume of sand. In the second instance, the connecting point to the hopper must be so low that a large portion of the dust escapes into the room via the space existing between the hopper and the floor.

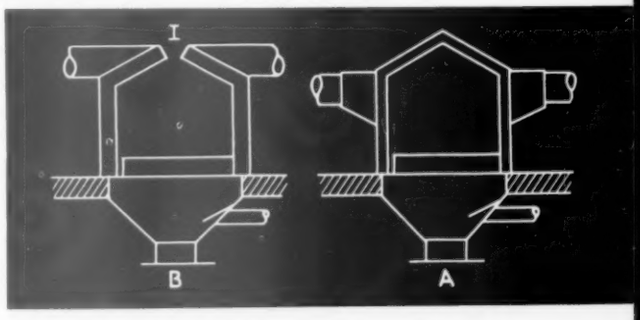
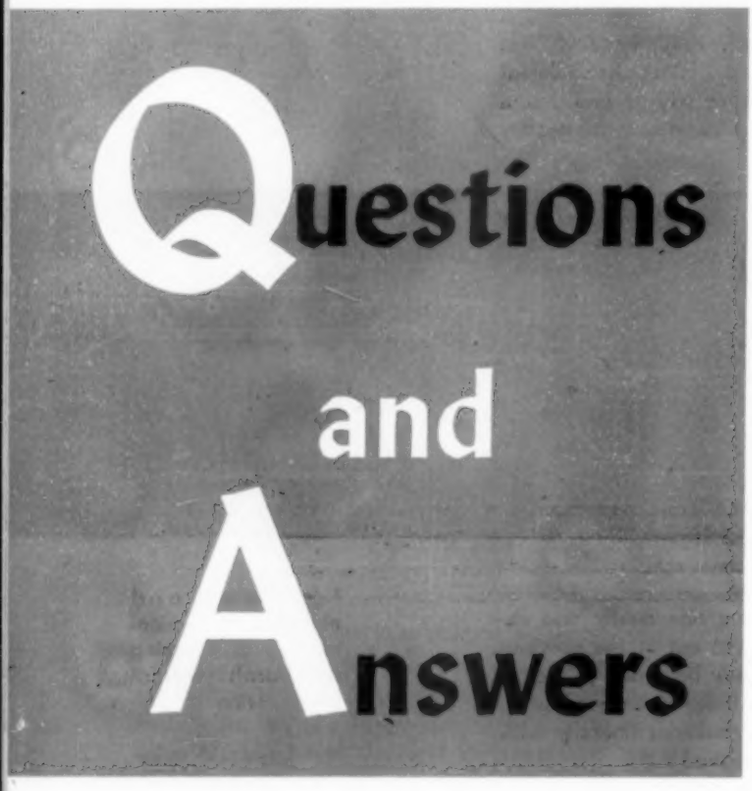


Fig. 6—Double canopy hood may be closed on top as at *A*, or open on top as at *B*

In the method shown, a collecting hood (5) is located directly below the concrete floor of the foundry, bringing the connection to the hopper as high as possible. One hood is used at each side or end of the shakeout as conditions permit. The hood is provided with an elongated neck which extends between the (*Please turn to page* 274)



Regulates Air Flow to Cupola

Q.—Can you tell me something about the use of the blast gate in a foundry?

A.—There is not much to tell. In the December, 1945, Data Sheet in THE FOUNDRY, a glossary of terms employed in the foundry, the term blast gate is described as a sliding plate in the cupola blast pipe to regulate the flow of air. In homely illustration it corresponds to and resembles the damper in an old-fashioned stovepipe. In the stovepipe and in the small blast pipe, the circular damper or gate is supported by a bar which projects through the pipe on opposite sides and serves as pivots. A handle on one of the ends is used to manipulate the damper inside the pipe. The position of the handle also indicates the position of the plate. Thus when the handle points up and down the plate is on edge and completely closes the passage through the pipe. When the handle lies in a horizontal position it indicates that the damper or gate is lying horizontally in the center of the pipe and parallel to the walls.

In the large size blast pipes, the vertical gate slides through a narrow slot in the pipe. Many cupolas are operated without any blast gate in the pipe. However, since the best results in the melting operation depend on having the weight of air, iron and coke under complete control, it is necessary to provide an apparatus and method of controlling the weight of air supplied to the cupola.

An electrical control device developed several years ago is connected with the line supplying current to an electric motor operating a centrifugal compressor with characteristics suitable for this purpose. This control operates an artificial restriction in the pipe between blower and cupola. This compensates for changes in cupola restriction, as well as for changes in atmospheric conditions so as to maintain a constant weight of air flowing at all times. The mathematical theory of the operation of this apparatus, also extended reference to other details, appeared in THE FOUNDRY Feb. 15, 1929. It is also described in *Melting Iron In The Cupola*, by J. E. Hurst, published by the Penton Publishing Co., Cleveland.

Make Cast Iron Furnace Parts

Q.—We are designing an oil furnace to be made in cast iron. The pot parts and discharge pipe will be subjected to high heat and we wish to know the proper iron mixture to give those parts a long life.

A.—During the past several years considerable success has been claimed for house heating furnace pots made from an alloy cast iron containing from 1.75 to 2.25 per cent Si; 0.50 to 0.80 per cent Mn; 3.00 to 3.50 per cent TC, and 0.85 to 1.25 per cent Cr. Those pots are used in coal burning furnaces and should be just as suitable for oil burning unless the design of the furnace is such that the oil flame impinges directly on the casting, raising it to incandescence. In such a case a highly alloyed material would have to be employed. Presumably the same composition could be used for the discharge pipe you mention.

Possibly a lower alloy cast iron containing 0.50 to 0.75 per cent Cr, such as employed for grate bars, might give satisfactory service for the furnace parts. Other element ranges could be 1.25 to 1.75 per cent Si; 3.10 to 3.30 per cent TC; and 0.50 to 0.75 per cent Mn. Determination of the most suitable material actually should be based on actual service test wherein the parts are subjected to maximum operating loads for long periods of time. Examination of the parts at regular intervals will indicate whether they will withstand the imposed service.

Makes Bronze Master Pattern

Q.—Can you suggest a good brass or bronze mixture for use in making master patterns? Good machinability and also a good smooth surface condition is desired.

A.—So far as we know there is no standard alloy used for the making of patterns although possibly various patternmakers will swear by a particular composition as being better than others. Some years ago the Saginaw Malleable Division made patterns in a number of different alloys after having tried the 80 per cent Cu,10 per cent Sn,10 per cent Pb composition for some time. Comparison of the results obtained led to the choice of a composition containing 80 per cent Cu,12 per cent Sn,4 per cent Pb and 4 per cent Zn.

However, since the high tin content makes the alloy more expensive, not to mention that tin is not as plentiful as desired, we believe that you could use any number of the red brass compositions with satisfactory results. These will include the 85-5-5-5 and the 83-4-6-7 alloys, which are fairly easy to cast and possess good machinability. You mention a smooth surface on the castings, and it should be pointed out that the smoothness will depend upon the fineness of the sand. The finer the sand, the lower the permeability and the chance of blows.

Consequently, you must make some compromise. Pinholed surface may result from permitting the metal to absorb gas during melting, so watch that phase also.

Casting Small Rods Straight

Q.—We have had unsatisfactory results in attempting to cast gray iron rods ¾ x 22 in. in sand molds. The castings must be round and straight. They are used in an application where the cast surface is necessary to resist heat and thermal shock. They are not machined. Would you anticipate trouble in casting these rods in a multiple permanent mold?

A.—The idea of casting the rods in permanent molds is feasible to a certain extent, but we do not think it would give satisfaction in the present instance. Even if the two halves of the mold fitted together closely and accurately in the beginning, they will warp to some extent later and leave a seam along the joint of the casting. The castings can be made in sand molds. In fact somewhat similar castings are made every day for test bars.

Instead of a split pattern and a two part mold, the pattern is solid and pulled through an opening in the end of the flask. Usually only two patterns are employed for making test bars, but the number may be increased to any reasonable extent. The castings are gated at one end and the openings at the opposite end are plugged with short pieces of stock core. This applies to castings molded and poured in a horizontal position. The rods may be molded and cast in a vertical position. A single sprue in the center distributes the metal through a number of small gates in the face of a plain, flat cope. An ingenious application of this method in the production of tappet castings was described and illustrated in the January, 1935 issue of THE FOUNDRY.

Gives Information on Cupola

Q.—We are planning on installing a cupola 24 in. diameter inside the lining. We shall appreciate information on construction and operating detail, how to build, locate the breast and tuyeres, height of tuyeres from bottom, size and number, size and location of slag hole, size of breast opening in shell, how to prepare breast and tap hole, size of charge, size of blower, pressure and volume of blast. What is the melting rate per hour of a 24 in. diameter cupola?

A.—Melting capacity of a cupola 24 in. diameter inside the lining is 4500 lb per hr. This requires a delivery of 900 cu ft of air per minute at a pressure of 6 to 8 oz. Power is supplied by a 5 hp motor and the consumption is 5½ kwh. Other sources of power: steam engine, gasoline or diesel engine, of course may be utilized. Size, shape and location of the tuyeres may vary to a considerable extent. In a typical installation the tuyeres are located 10 in. above the bottom.

Each of the six tuyeres is 4 x 6 in. at the shell and flared to 4 x 12 in. inside the lining to give a practically continuous opening. A 2 in. diameter slag hole is located opposite the tap hole and about 2 in. below the tuyeres. The slag hole opening in the shell is 4 x 6 in., and the breast opening is 6 x 12 in. The usual charge for a cupola this size is 500 lb iron, 50 to 60 lb coke and a small shovelful, say 15 to 20 lb limestone.

Stack Entrances Are Plugged

Q.—In a pulverized coal-fired furnace making white iron for malleable manufacture, a pressure exists which causes considerable flame to come out of the pour-back, skim and rabbling holes. This even exists, though to a much lesser extent, after the heat is tapped and the air-coal feed is set back. This condition did not exist previously except for a short period of a day. At present it takes place throughout the entire heat.

A.—While malleable furnaces usually are operated on a slight amount of back pressure to prevent infiltration of air, it is far from sufficient to cause the flames to emerge as you describe. Therefore, it appears that egress of the products of combustion through the natural vent, the stack or chimney, is being hindered greatly in some manner. Possibly you are collecting considerable fly ash on the bridge wall which decreases the opening sufficiently that the stack draft cannot operate properly. Similarly, enough fly ash may be collecting in the stack to close partially the flue opening into the furnace which reduces the available draft to a point insufficient to carry off the gases.

There is a possibility you have changed your source of supply for coal and have been receiving some high-ash coal which aggravates the conditions through generation of greater quantities of fly ash. If it were not for the fact that the flames continue to come out after cutting back the air-coal feed, it might be assumed that forcing the furnace caused the flame to emerge. Our suggestion is to clean off the bridge wall and openings into the stack. If that does not clear up the situation, we would write to the supplier of the powdered coal equipment or furnace requesting some help.

GANGWAY!

By J. A. Patterson

"But Boss, she insists a atomizer is much better for oiling parts than a messy old oil can."

Antimony and Tin Cause Hardening of Iron

Q.—Recently we lost our entire heat due to the brittleness of the iron after it was poured into castings, and we are sending some specimens of the iron as cast and the material forming the major part of the charge. You will note that the latter is a cast iron bearing with a babbitt lining, and two charges were made up entirely of scrap bearings in which our cupola charger failed to melt out the babbitt. Some of the iron came out gray and brittle and some came out hard and brittle, so much so that a hammer blow caused it to fly into pieces. We believe that the brittleness is caused by the antimony in the babbitt, and would like your opinion.

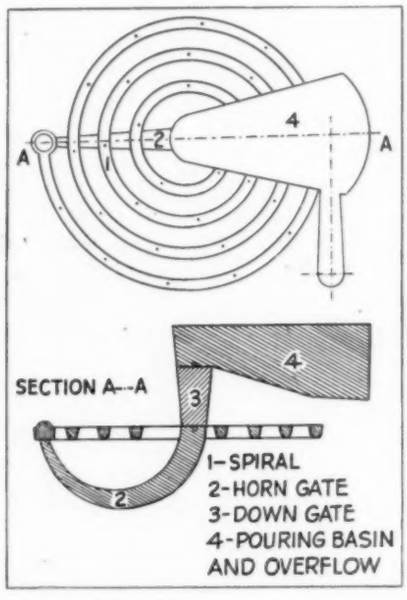
A.—Babbitt metal contains varying amounts of tin and antimony, although there is a lead-base babbitt containing only antimony and lead. Both tin and antimony have a deleterious effect on gray cast iron—tending to cause marked hardening and brittleness. While general opinion is that the low melting point metals such as tin and antimony will volatilize and pass out the cupola stack with the gases long before the iron is at the melting point, that does not hold with the facts since the metal must boil before volatilization or vaporization occurs. Boiling point of tin is 4100 F while that of antimony is 2640 F. Hence, both could be carried down with the melting iron and combine with it.

Tin has a marked hardening effect probably because of the formation of iron and tin compounds, while antimony increases greatly the depth of chill. In your case it probably is a combination of tin and antimony causing the white fracture iron in the ⅜-in. section, with antimony being the greater culprit of the two. Your mention of a hammer blow causing the casting to fly into pieces parallels an experience of Piwowarsky who mentioned that gray iron containing only 0.19 per cent Sb was so brittle that it cracked when struck by a hammer.

Provide Information on Spiral Fluidity Test

Q.—Can you give us any information on, and the dimensions for, a spiral fluidity test for gray iron such as employed in stoveplate production?

A.—The spiral fluidity or runnability test piece commonly used for gray iron and some nonferrous alloys is that developed by Saeger and Krynitsky some years ago after a study of similar procedures. Total length of the spiral is 60 in. and, as may be seen from the accompanying drawings, the cross section is in the form of an inverted triangle. Molten metal is poured into the pouring basin, which feeds metal into the horn gate and thence into the outer end of the spiral. The overflow attached to the pouring basin permits maintenance of a constant pressure head of molten metal. Inner end of the spiral is vented.



Plan and elevation views of the spiral test piece with various parts indicated

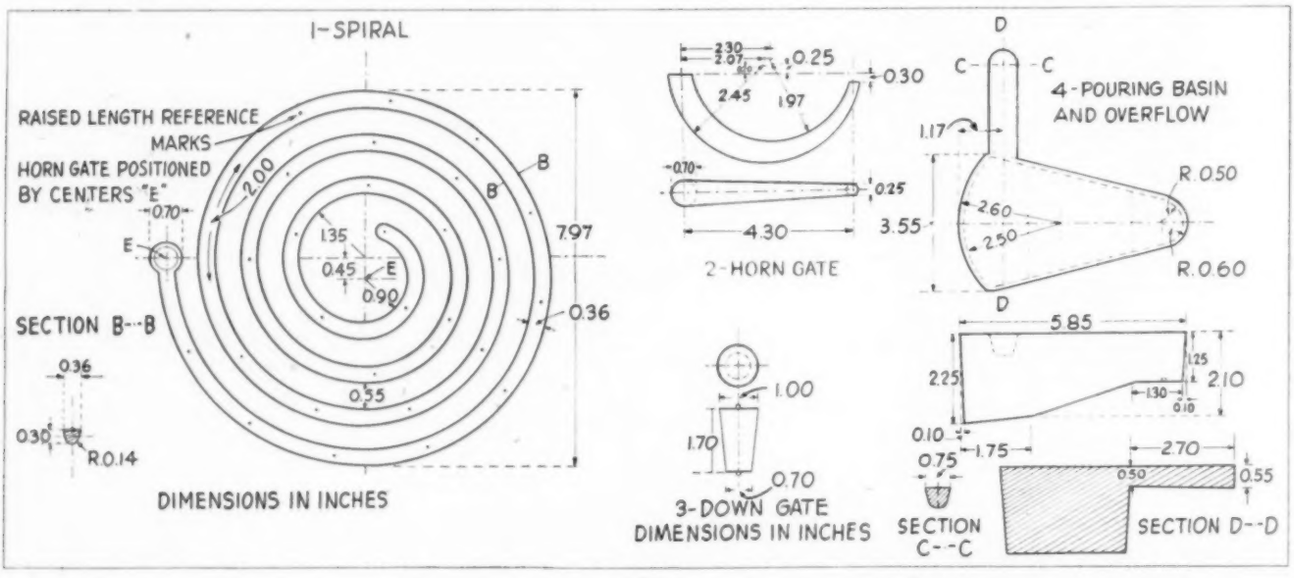
Molds containing the spiral cavity may be green or dry sand. Many prefer the green sand mold, and base their choice on the argument that the castings will be poured in green sand. Hence, the results obtained with the spiral in green sand will be more comparable than if poured in dry sand. Usually, spiral poured in dry sand runs farther than when poured in green sand. For more extended information on the spiral fluidity test we suggest that you study "Method for Studying Running Quality of Cast Metal," by C. M. Saeger Jr. and A. I. Krynitsky in *Transactions* of the AFA, Vol. 39, 1931.

Assemble Plaster Molds To Permit Pouring

Q.—We are interested in making pressure-cast matchplates, and would like to have some information particularly on how the mold is assembled for pouring.

A.—We are not quite clear on just what information is desired, but assume you refer to the method of spacing the cope and drag plaster molds, etc. Practice we have observed is to set the drag on a low table about 2 ft high. The table has a cast iron top, planed smooth, and is supported by iron pipe legs. Dimen-

(*Concluded on page* 122)



More detailed drawings of the various parts of the spiral fluidity test piece showing the dimensions

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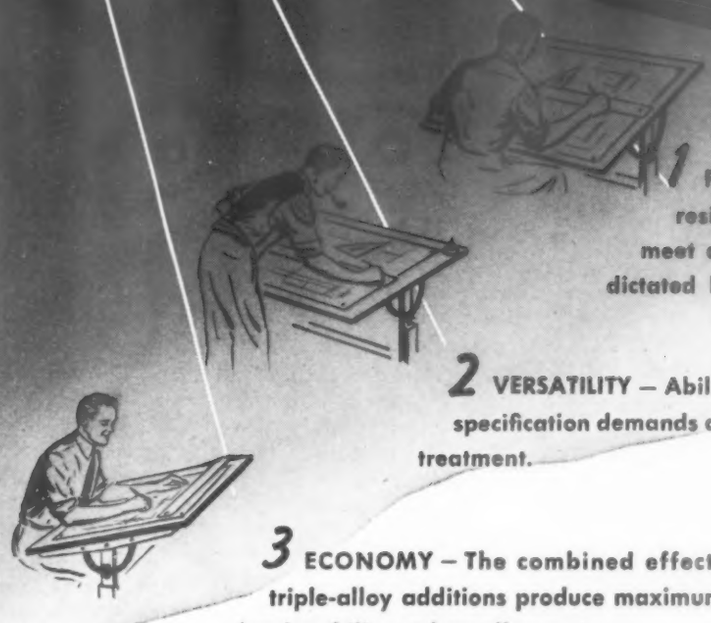

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2 VERSATILITY – Ability to meet varied specification demands after suitable heat treatment.

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We invite inquiries regarding the production, treatment or uses of triple-alloy steels, containing Nickel.

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(*Concluded from page* 120)

sion of the table is such as to take the standard size mold. After the drag is in positon, strips of asbestos board about ¼-in. thick and 1½ to 2 in. wide are placed around the outside edges. Thickness of strips is such as to give the desired thickness of the matchplate, and the width of the strips such as to provide the proper dimensional area of the matchplate.

Then the cope is placed in position, followed by the top plate of cast iron about ¾ to 1 in. thick. The top plate is clamped to the bottom plate or table with a number of patternmakers' adjustable clamps. A thin disk of asbestos paper (about 1/16-in.) is placed over the sprue opening and it is held in place by the metal reservoir. The reservoir is filled with molten aluminum, the cap with its compressed air line is clamped in place, and the air turned on. About 5 to 15 psi pressure is used and is sufficient to force the metal through the disk into the mold. Pressure is maintained for a short period to insure proper feeding.

Bust Casting Requires Considerable Skill

Q.—We have an inquiry for a bronze bust of Abraham Lincoln. Can you tell us where we can secure a pattern or model for this casting? We doubt if one is available in Canada, but presumably a pattern of this kind may be in existence somewhere in the United States. We shall appreciate information on this point, also on the technique, process, materials and equipment employed in the production of castings of this character.

A.—We have seen many bronze figures of Abraham Lincoln, but invariably each figure, full size, is either sitting in an elaborate chair, or standing on a pedestal. However, it is possible that busts have been cast. You might direct an inquiry to various firms engaged in the production of statuary and ornamental bronze castings.

Nearly all statues, busts, etc., are one-off jobs, never repeated. All the gear is destroyed. In the lost wax method the clay model is destroyed in the process of making the mold. In the all-sand process the clay model is enclosed in a plaster cast. The cast is taken apart, the clay is dug out, and then a plaster pattern is cast inside the first mold.

The sand mold for the casting is made from the plaster pattern. The mold is taken apart, the plaster pattern is removed, the mold is closed and rolled over so that the drag is on top. The hollow mold then is packed full of sand reinforced with suitable hand-made arbors. The drag is lifted off, thus exposing one half the core. After the molder has shaved a thickness of sand from the core to correspond to the desired thickness of metal, the drag is replaced and the entire mold is rolled over again. The cope then is lifted off and a thickness of sand is shaved from the upper half of the core. At no stage is the core removed from the mold.

The mold then is dried and closed and a suitable reservoir or basin built on top large enough to hold the required amount of metal. The sprue which connects the basin with several wax gates leading to various parts of the mold cavity is plugged until the basin is filled. It is a highly intricate job and hardly to be attempted by a person with no former experience.

Operating the Cupola With Charcoal

Q.—We plan to operate a small gray iron foundry in connection with our mines. Since all supplies must be flown in, coke is out of the question. We have an unlimited supply of charcoal. If that is a suitable fuel we shall appreciate any information on any features that may be different from coke-fired cupola design, amount of air, ratio of iron to fuel, etc.

A.—We regret that our personal experience does not include any knowledge of a cupola in which charcoal is used as a fuel. From random reading we have gathered the general impression that charcoal has been employed for melting iron; in fact, in the early days it was the only fuel available, but it passed out of the picture many years ago. The following quotation from *Principles of Iron Founding*, by the late eminent authority Dr. Moldenke, is applicable to your present problem:

"So far as the foundry is concerned, charcoal no longer is made use of for melting purposes. It is too expensive and the waste is very great. The highly developed cellular structure of charcoal and the ease with which it burns promotes the rapid formation of carbonic oxide (or incomplete combustion of carbon). This means lower temperature and indifferent melting results. Hence, to accomplish anything in the way of good melting a great excess of fuel must be used, and this is costly. Records of cupola melting with charcoal as practiced in Sweden in the early foundry days are of great interest.

"The earliest pseudo-cupolas (Reaumur tilting cupolas) melted 100 lb of iron with 55 to 75 lb of charcoal—the melting loss being 5 to 9 per cent of the metal. The more modern constructions did not do so much better. Karsten mentions 50 lb of charcoal as melting 100 lb metal ordinarily, but when the pig iron was fusible with difficulty, it took 66 lb of charcoal to do this. An East Prussian charcoal blast furnace, when used as a cupola for simple melting, did its work with 36 lb of charcoal per 100 lb of pig iron."

Casting Trouble May Be Due to Shrink

Q.—We are having trouble with castings which previously were produced without any difficulty. Present defect seems to be a combination between a blow and a shrink. Casting was gated with a thin gate on the sides, but was replaced with a heavy gate and a feeder. However, that did not work. We ran out of purchased scrap and are now using 65 to 70 per cent pig iron plus sprue and overiron. In two charges we melted all pig iron. Pig iron contains 2.86 per cent Si; 0.50 per cent P, and 0.90 per cent Mn. Our iron is hotter than we ever had it before. Cupola is lined to 26 to 27 in. at the melting zone. We want a good, soft gray iron for the castings which weigh up to 30 lb with 1-in. sections.

A.—Without some of the defective castings available for examination, it practically is impossible to determine the probable cause of the trouble. However, our guess from the information presented, is that the difficulty is a shrink. You mention that your iron is hotter than you ever had it before, and such iron will tend to shrink more than that with a lower temperature. Hence, proper risering is necessary to provide adequate feeding. Of course, there is a possibility that if the moisture of the molding sand is on the high side, hotter iron might lead to blows.

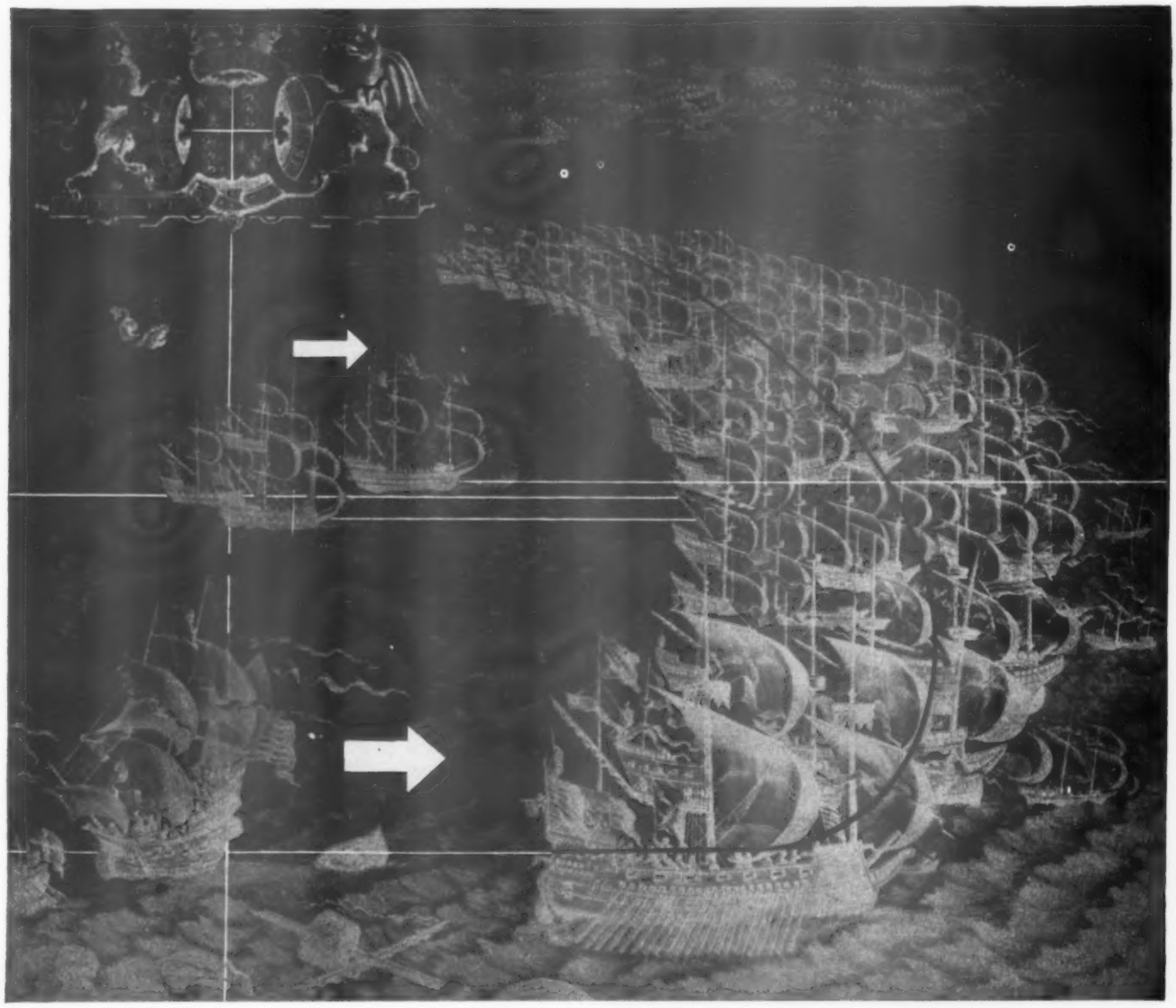
If our guess is right on shrink, all that is required is a change in gating procedure so that proper feeding of the casting is assured. Since we do not know what the casting looks like, we cannot make any suggestions except to advise risers over the heavy sections—preferably having the metal enter those sections so that the metal in the risers will be the last to freeze. Neck between the casting and riser should be short so that the hot sand prevents freezing off.

Your silicon appears to be quite high for 1-in. metal sections since high silicon iron tends to be open-grain and shrinkable in comparatively heavy sections. Our suggestion would be under 2 per cent Si. There is no reason why an all-pig mix cannot be used, provided the composition is satisfactory for the metal section involved. With the high silicon pig iron you now have available, and the comparatively high silicon in return sprues and scrap, you can obtain a satisfactory iron mix by reducing the pig iron content and substituting some steel scrap. For example, reduce the pig iron to 50 per cent, hold the return sprue and scrap to 30 per cent, and add 20 per cent steel scrap.

A LITTLE DOES A LOT

The Spanish built their colossal Armada to smother England by sheer weight. But Drake, with a scratch fleet of nondescript ships, and some brains, reduced the Armada to an unpleasant memory.

Not only in warfare can a little do a lot, intelligently applied. Today a little molybdenum is doing a lot to improve the strength and toughness of good cast iron. The foundry man's market is broadened and many a user's production headaches relieved. Practical working data is available on request.



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MEN of Industry

KENNETH PRIESTLEY

KENNETH PRIESTLEY has been appointed research metallurgist of the Foundry Division, Eaton Mfg. Co., Detroit. A graduate of Michigan State College, Mr. Priestley joined the division in 1934 as assistant metallurgist and became chief metallurgist the following year. He is an active member of the American Foundrymen's Association and has served as chairman of its Gray Iron Shop Operation Course and as a member of the Executive and Advisory Committee of the Gray Iron Division. He is also a director of the Saginaw Valley Chapter of that organization.

♦ ♦ ♦

KEITH J. HARRIS

Keith J. Harris, secretary and treasurer, Ross - Meehan Foundries, Chattanooga, Tenn., has been elected a vice president, in addition to his present duties. Mr. Harris joined the company in 1926 as an auditor, was made assistant secretary-treasurer in 1937, and secretary-treasurer in 1942. He was formerly associated with International Harvester Co. **Herbert L. Suplee** has been named vice president in charge of sales. Mr. Suplee attended Carnegie Institute of Technology and was later associated with the Koppers Co. as an engineer, the Guggenheim Exploration Co. and Chilean Copper Co., both in Chile. He became associated with Ross-Meehan in 1935 as an estimator and was made assistant sales manager in 1945.

Russell Franks, since a year ago chief metallurgist, Union Carbide & Carbon Research Laboratories Inc., has been appointed to the technical service and development department, Electro Metallurgical Co. Both companies are units of Union Carbide & Carbon Corp., New York. Mr. Franks, a graduate of Virginia Polytechnic Institute, joined the staff of Union Carbide & Carbon Research Laboratories Inc. in 1921 and since that time has specialized in investigating the properties of chromium alloy steels and has presented many papers on this subject. He will make his headquarters in Pittsburgh.

♦ ♦ ♦

R. W. Hathaway, until recently plant superintendent, Marine Division, Federal Mogul Corp., Greenville, Mich., has been appointed works manager, Cadillac Malleable Iron Co., Cadillac, Mich.

♦ ♦ ♦

W. J. Shive, recently released by the Navy with the rank of lieutenant, has returned to the Sterling Steel Casting Co., East St. Louis, Ill., as district sales engineer in charge of its Indianapolis office. Mr. Shive, a graduate of the University of Illinois, was associated with the company for two years prior to his military service. Previous to that he was employed in the Berwick, Pa., foundry of the American Car & Foundry Co., New York.

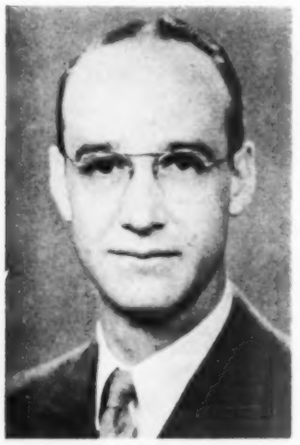
♦ ♦ ♦

Charles S. Reed Jr. has been elected president and general sales manager, Chicago Retort & Fire Brick Co., Chicago. He was formerly secretary, which position has been assumed by **E. W. Reynolds.** As sales manager, Mr. Reed succeeds Henry Tanner, retired. **Carl E. Von Luhrte,** who has represented the company in Davenport, Iowa, where during the past year he has served as chairman of the Quad-City chapter of

(*Continued on page* 126)

HERBERT L. SUPLEE

RUSSELL FRANKS



R. W. HATHAWAY

WOODWARD IRON COMPANY

WOODWARD, ALABAMA

General Sales Offices

1515 First National Building • Birmingham, Alabama • Phone 4-6786

(*Continued on page* 124)

the AFA, has been transferred to Chicago to become sales manager, Western Division. **Robert P. Stevens,** Chicago, formerly refractories engineer, has assumed the post of sales manager, Eastern Division. **John H. Hock,** who has represented the company in Northern Indiana, has been shifted to the central Indiana territory. New appointments to the sales staff, all recently released from military service, are: **Jerald E. Pixley** in eastern Michigan; **Mark L. Marino** of St. Paul to handle Minnesota; and **George J. Friesner** of Davenport to operate in Iowa and western Illinois.

♦ ♦ ♦

American Foundry Equipment Co., Mishawaka, Ind., has announced a number of sales territorial changes and appointments. **Davis G. Taylor** has been named sales representative for a newly created territory covering the San Francisco Bay area, with headquarters in San Francisco. Mr. Taylor has been a sales engineer in the home office for the last two years. **John Getzen** has been appointed a district sales representative in the Birmingham area. A graduate of Georgia Institute of Technology, Mr. Getzen spent the last seven years in the Army, and has been in charge of the Birmingham Ordnance District. Prior to that he was assistant to the president of Stockham Pipe Fittings Co., Birmingham, for 16 years.

Troy T. Alverson has been appointed sales representative in the new Baltimore sales office. Previous connections include general superintendent, Crane Co., Chattanooga, Tenn.; general manager, Maryland Sanitary Mfg. Co.; manager of a Navy shell plant, and assistant to the factory superintendent, Glenn L. Martin Co., Baltimore. **David E. Neustadt,** formerly Philadelphia branch manager, Egry Register Co., has been appointed district representative for the Los Angeles area of the company. **John Nixon,** following his release by the Navy with the rank of lieutenant commander, will have charge of the sales office in Atlanta. Mr. Nixon, a graduate of Georgia Institute of Technology, was formerly junior engineer with an oil company, college professor and football coach.

JOHN NIXON

♦ ♦ ♦

Hiram Brown, until recently assistant works manager, Aluminum Industries Inc., Cincinnati, has been appointed chief nonferrous metallurgist, Solar Precision Castings, a division of Solar Aircraft Co., Des Moines, Iowa. Previous connections include Aluminum Co. of America, Cleveland and Detroit, and Frontier Bronze Corp., Niagara Falls, N. Y.

♦ ♦ ♦

Don E. Jordan has joined the sales staff of the Pacific Steel Foundry Co., Portland, Oreg., and has been put in charge of its newly opened office in Seattle. Mr. Jordan was formerly associated with the Western Gear Works, Seattle. **R. H. Stitt** has been appointed representative in the San Francisco territory. **John B. Rood** has been made special sales engineer, with headquarters in Portland.

♦ ♦ ♦

Homer W. Northrup has joined the Chicago technical section of the International Nickel Co. Inc., New York, with headquarters in Chicago. Mr. Northrup was formerly with the melting department of the Iron & Steel Foundry Division, Crane Co., at Chicago and at its plant in Chattanooga, Tenn. He spent several years in that company's research laboratories and was in charge of the experimental foundry in its research and development department. He is a graduate of the South Dakota School of Mines.

♦ ♦ ♦

M. J. Gross has been appointed manager of engineering, General Electric X-Ray Corp., Chicago. Mr. Gross was released from the Medical Administration Corps of the Army in July, 1945, with the rank of major, to conduct a technical investigation into the manufacture of x-ray equipment in Germany. He has been associated with the company since 1930.

♦ ♦ ♦

B. P. Spann, recently released by the Navy with the rank of lieutenant commander, has returned to Gardner-Denver Co., Quincy, Ill., as advertising manager. Mr. Spann, who had been with the company since 1934, was granted a leave of absence in 1942 to enter the Navy.

♦ ♦ ♦

H. L. Grapp has been elected president and general manager of the Despatch Oven Co., Minneapolis, succeeding his father, **A. E. Grapp,** who has been elected chairman of the board of directors. The latter founded the company over 44 years ago. In 1913, when it was incorporated, he was made president and treasurer, acting in this ca-

(*Continued on page* 130)

DAVIS G. TAYLOR

JOHN GETZEN

TROY T. ALVERSON

DAVID E. NEUSTADT

New ways to save with PHILCO BATTERIES

Now you have palletized unit loads, and the new long-life Philco "Thirty" motive power batteries to make modern electric trucks even more useful and economical. The 30% longer life of Philco "Thirty" means substantial savings in battery replacements. Ask for Philco "Thirty" as initial equipment in your new trucks. Specify Philco "Thirty" on battery replacement orders. Write for specification data today. PHILCO CORPORATION, Storage Battery Division, Trenton 7, New Jersey.

PHILCO

FOR 50 YEARS A LEADER IN INDUSTRIAL STORAGE BATTERY DEVELOPMENT

A NIAGARA OA

Perfectly controlled to give you faster, more economical cleaning production.

Speed cleaning at low cost results from the flood of abrasive that pours in a constant torrent from the spinning wheel of an Airless Wheelabrator . . . impacts from more than a quarter-million particles of abrasive per second or 300 pounds of abrasive per minute.

In terms of airblasting it would take approximately five 3/8" nozzles operating under an air pressure of 90 lbs. P. S. I. and utilizing up to 225 H. P. to equal the foregoing accomplishment of a standard Wheelabrator requiring only 15 H. P.

The blast stream of the Wheelabrator is under perfect control and the full impact of its power is uniformly concentrated upon the job, scouring sand and scale from every pocket, recess, and fissure. Unlike airblasting there are no variations in pressure, velocity or abrasive volume to alter cleaning efficiency and production speeds. Wheelabrating can be timed practically to the second.

Savings result from reduced costs of labor, power, space, machining and grinding, cutting tools, inspection, etc. as reflected in the following statements of users:

WHEELABRATOR SAVINGS TOLD BY USERS *

"Reduced cleaning time approximately 50%." (Malleable Foundry)
"Reduced direct labor costs 50%." (Automotive Mfr.)
"Saved 300 cubic feet of air per minute." (Malleable Foundry)
"5 hours' cleaning time reduced to 15 minutes." (Michigan Mfr.)
"Our electric bills have been cut almost in half." (Gray Iron Foundry)
"Cleaning now with four less operators." (Gray Iron Foundry)
"Time cut from 24 hours to 8 hours." (A Connecticut Steel Foundry)
"Decided increase in tool life between grinds." (Prominent Tool Mfr.)
"Replaced 14 tumblers, saving considerable space." (Canadian Mfr.)
"18 hours' cleaning time reduced to 3 hours." (Brass Foundry)
"Machinability much improved over tumbled castings." (Gray Iron Foundry)

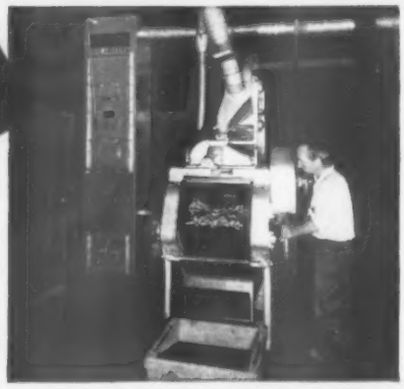
* Names of users supplied upon request.

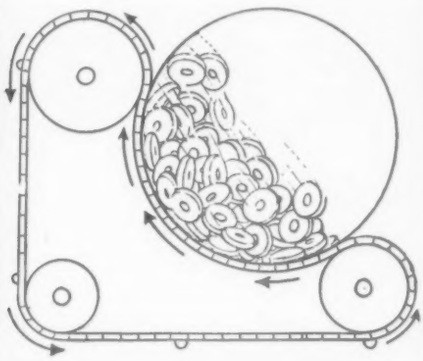
American
FOUNDRY EQUIPMENT CO.
505 South Byrkit Street, Mishawaka, Indiana

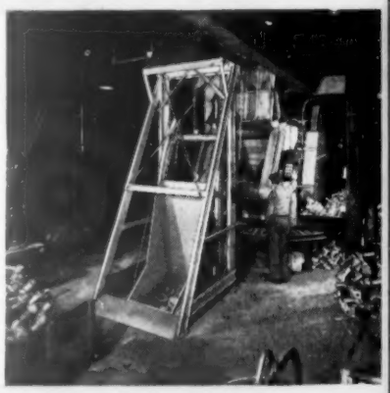
CLEANING POWER

WHEELABRATOR

TUMBLASTS

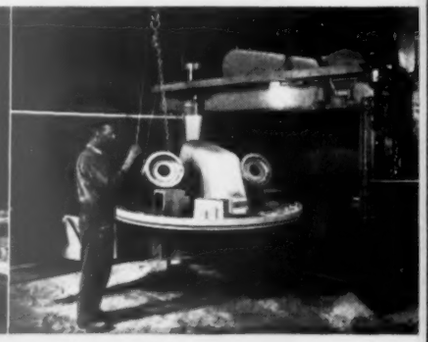






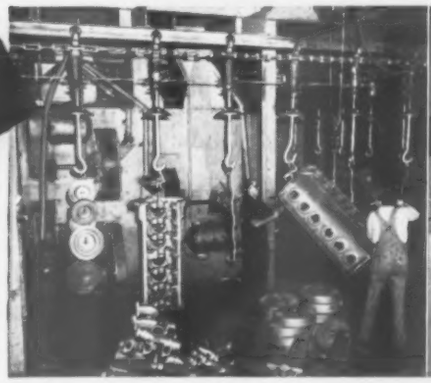
Tumblasts are made in eight sizes, having capacities of 1 to 63 cu. ft. for handling loads ranging from less than a hundred pounds to several tons, and for cleaning individual parts weighing from a fraction of an ounce up to hundreds of pounds each. The cleaning chamber, shown above, is formed by an endless apron conveyor, an exclusive *American* development that is unmatched for simplicity and operating effectiveness. The movement of the conveyor completely exposes all surfaces of every piece to the full effect of the abrasive blast, and facilitates rapid loading and unloading.

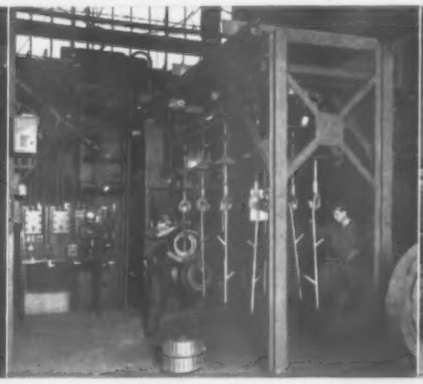
TABLES

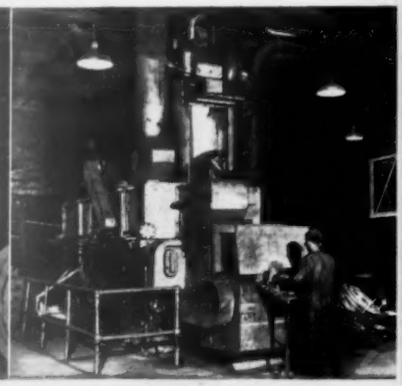


Tables are used for cleaning flat or fragile work that is not adapted to tumbling. They are built in three types: The *Multi-Table* is recommended for work having high vertical edges or intricate recesses and cavities. The *Plain Table* is especially suitable for work having few pockets and vertical edges, such as furnace castings. *The Swing Table* is an ideal general purpose machine for the shop desiring moderately priced equipment for handling a wide range of large and small pieces where daily production does not warrant buying several types of equipment.

CABINETS







Cabinets are designed for handling work where special production problems prevail or where the work, due to size, shape or weight, cannot be adapted to a standard machine. Complete exposure of the work to the blast is effected by means of special conveyors which impart a rolling, tipping, or spinning motion to the work during cleaning. Typical applications include: Cylinder blocks, sanitary ware, axle housing, crankshafts, air brake reservoirs, etc.

WORLD'S LARGEST BUILDERS OF AIRLESS BLAST EQUIPMENT

(*Continued from page* 126)

pacity until the recent change. He will retain the office of treasurer. **H. L. Grapp** has been associated with the company for over 28 years, during which time he has worked in all departments. **F. H. Faber,** who joined the company in 1928, has been elected executive vice president and general sales manager. **G. M. Lund,** formerly secretary, has been made vice president and secretary. Mr. Lund has been with the company for eight years. **C. P. Doherty** has been appointed factory manager after serving the company for 26 years in various factory departments. **Lloyd Johnson,** who has spent 16 years in the factory, succeeds Mr. Doherty as factory superintendent.

♦ ♦ ♦

Herbert M. Rich Jr., for the last three years New York district manager, Electro Metallurgical Sales Corp., unit of Union Carbide & Carbon Corp., New York, has been appointed division manager of the New York and Birmingham territories, with headquarters in New York.

♦ ♦ ♦

Col. Arthur J. Seiler has been appointed executive vice president, Phosphor Bronze Smelting Co., Philadelphia. During his period of military service which was recently terminated, Col. Seiler served in the Philadelphia and Detroit ordnance districts, as senior ordnance officer for the Pacific Warfare Board, was base ordnance officer in Manila and after the end of the war served as assistant ordnance officer in Japan. A graduate of Massachusetts Institute of Technology, Col. Seiler's previous connections included assistant to general works manager, the York Corp.; vice president, Thomas Shipley Inc., and president, York-Shipley Inc.

♦ ♦ ♦

Fred Mueller, vice president and general sales manager, Corn Products Refining Co., New York, has been made a director of that company. Mr. Mueller began his service with the company in the bulk sales department, was elected vice president of Corn Products Sales Co. in 1934 and was made general sales manager of Corn Products Refining Co. in 1944.

♦ ♦ ♦

J. R. G. Harris has been appointed manager in charge of sales of resistance welding electrodes and alloys, Ampco Metal Inc., Milwaukee. **D. S. Goebel** has been named manager of mill products sales and continuous castings. **G. E. McCulloch** has been made manager of safety tool sales. **F. C. Hawks** has joined the sales staff as field engineer and will handle mill products sales, with headquarters in Chicago. **Al Jenss** has been appointed manager of the licensing bureau in charge of activities of licensee foundries in key cities which are casting Ampco metal from ingot.

♦ ♦ ♦

Frank Weir has been appointed sales manager of the St. Louis district sales office of Harbison-Walker Refractories Co., Pittsburgh. **Karl W. Sieling** has been made sales manager of the district sales office in Houston, Tex. Mr Weir and Mr. Sieling have served the company for a number of years as representatives and are well known in the districts to which they have been appointed.

♦ ♦ ♦

Donald L. Colwell, Chicago district manager, the National Smelting Co., Cleveland, has received the Distinguished Civilian Service Award of the Navy Department for outstanding achievement while serving as chief of the Conservation Division of the Production Branch, Office of Procurement and Material, for the Navy.

♦ ♦ ♦

J. D. Garinger, mechanical engineer at the Bay City, Mich., plant of the Dow Chemcial Co., Midland, Mich., has been transferred to the magnesium sales division, in the Chicago office. A graduate of Kansas State College, Mr. Garinger spent six months at the foundry of the Aluminum Co. of America, in Cleveland, before joining Dow Chemical Co. **Lt. Col. Guy DeKuiper** and **Lt. Leland Wallace Jr.,** recently released from active duty by the Army, have joined the magnesium sales staff of the company. Mr. DeKuiper, formerly with the New York sales office of the company, will be stationed in the Washington office. Mr. Wallace, who was graduated from Washington University just before entering the service, in 1943, will be located in the St. Louis office.

♦ ♦ ♦

A. C. Griffith, until recently with the United States Gypsum Co., Chicago, has been appointed sales manager of the Standard Brake Shoe & Foundry Co., Pine Bluff, Ark.

♦ ♦ ♦

Lawrence A. Pomeroy Jr. has been appointed traffic manager, National Malleable & Steel Castings Co., Cleveland, succeeding **Carl L. Stripp** who has retired because of ill health. Mr. Pomeroy, a graduate of Yale University, has recently been released from active duty by the Navy.

♦ ♦ ♦

Russell L. Peck has been appointed refractories engineer, Norton Co., Worcester, Mass. He will work with **F. E. Leiby** in the territory comprising Philadelphia, Delaware, eastern Maryland, eastern Virginia and eastern North Carolina.

♦ ♦ ♦

E. S. Avery has been appointed manager of a factory branch in Chicago, recently opened by Waltham Grinding Wheel Co., Waltham, Mass., and will supervise the distribution of products for that company in Illinois, Indiana, Wisconsin, Minnesota, Missouri and western Michigan. Mr. Avery has been

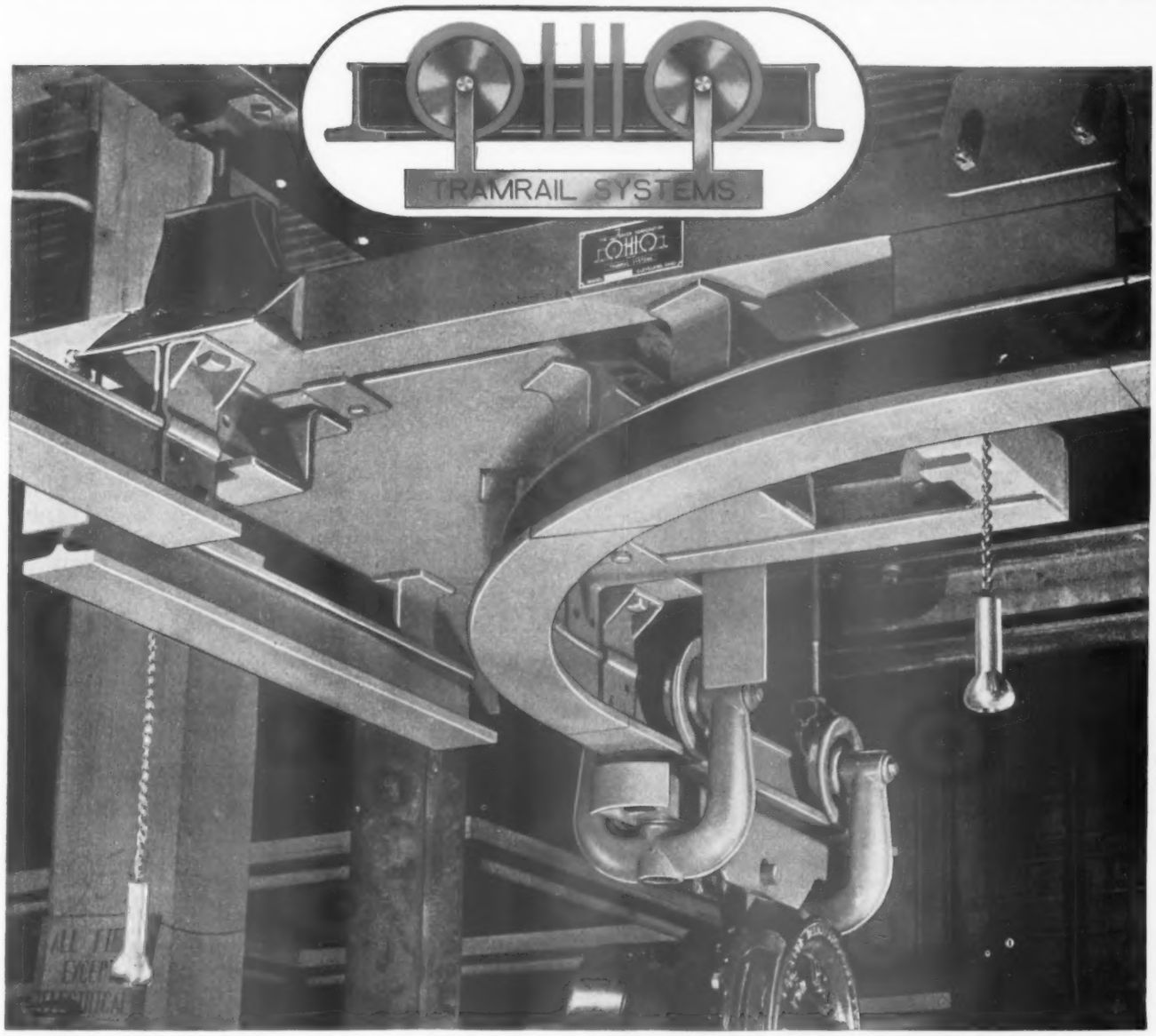
(*Continued on page* 132)

HERBERT M. RICH, JR.

COL. ARTHUR J. SEILER

FRED MUELLER

GREATER SAFETY AND COMPACTNESS



Here is a tramrail system engineered with noteworthy improvements. First of all, OHIO Tramrail Systems assure greater safety regardless of carriage position. Being fully safeguarded with baffles, there is no chance for the trolley to roll off.

OHIO Tramrail Systems are also more compactly built. They require only a minimum of superstructure and fittings. The spur tracks are as close as 30 inches apart. Only *straight* track is run into the switches. The 90° curve shown above and the 45° curves are all built integral with the switch. Both curves are made in right hand, left hand, "Y" and three way. All of these are easily electrified for motor operation.

OHIO Tramrail Systems also eliminate the old method of fitting the curved tracks on the job. This saves time and money. Your installation is a factory production job. Even the angular rails are accurately cut with correct spacings before they are shipped. All parts are interchangeable. No jolting of trolleys in passing over switches. Bulky wire jumpers are eliminated. The installation gives a clean ceiling. Even remote control is easily arranged and the system assures years of trouble-free service with a minimum of maintenance. Write for further details.

THE FORKER CORPORATION

1826 EAST 47th STREET · CLEVELAND 3, OHIO

(*Continued from page* 130)

associated with the grinding wheel industry for over ten years. He was Michigan manager of Simonds Abrasive Co. at the time of his entrance into the U. S. Naval Reserve in which he served as a lieutenant under the Inspector of Naval Material, Chicago.

♦ ♦ ♦

Walter F. Spoerl has been appointed general sales manager of the mechanical goods division of United States Rubber Co., New York, succeeding **Herman A. Everlien,** who died recently after 43 years with the company. Mr. Spoerl began with the company 38 years ago as a clerk in the Chicago sales office.

♦ ♦ ♦

P. J. Patton Jr. has been appointed regional manager of the Middle West sales area, industrial division, Ransome Machinery Co., Dunellen, N. J., a subsidiary of Worthington Pump & Machinery Corp. His headquarters will be at Chicago. Mr. Patton was formerly eastern area manager of the welding equipment division of A. O. Smith Corp., Milwaukee.

♦ ♦ ♦

L. R. Rothenberger has been appointed general sales manager, the DoAll Co., Minneapolis, and Des Plaines, Ill. Mr. Rothenberger, a graduate of the University of Minnesota extension school, has been associated with the company for the last seven years and has spent the last three years in sales work. He will direct sales programs for the company's sales stores throughout the United States, Canada and Mexico.

♦ ♦ ♦

Paul G. Maganus, who has recently been released from Chemical Warfare Service, has been appointed technical supervisor, U. S. Rubber Co., Detroit. Mr. Maganus was a metallurgical engineer for Bohn Aluminum & Brass Corp., Detroit, for five years, prior to entering military service.

♦ ♦ ♦

I. L. Sparberg, who has been associated with Samuel Greenfield Co. Inc., Buffalo, for many years, has been made manager of the Midwest division, with headquarters in the National Bank building, Detroit.

♦ ♦ ♦

Ernest H. Bellard has been appointed sales manager of the ventilator division, the Swartwout Co., Cleveland. Mr. Bellard has been with the company since 1942. He was formerly associated with the Bellevue Mfg. Co., Bellevue, O.

♦ ♦ ♦

Ellis L. Spray, vice president in charge of the elevator and air conditioning divisions of Westinghouse Electric Corp., Pittsburgh, has been elected executive vice president of the B. F. Sturtevant Co., Division of Westinghouse Electric, Boston, recently acquired by the parent company. **G. C. Derry,** formerly vice president of the Sturtevant Co., has been elected vice president and general manager of the division., **E. B. Williams,** formerly vice president of the Sturtevant Co., continues in that office with the new subsidiary.

♦ ♦ ♦

John J. Walsch has been named vice president and foundry manager, Whitewater Mfg. Co., Whitewater, Wis. Mr. Walsch served his foundry apprenticeship with G. H. Smith Steel Casting Co., Milwaukee, and took an extension course in metallurgy at University of Wisconsin. Later he was associated with the

JOHN J. WALSCH

Crucible Steel Casting Co., Lansdowne, Pa., as foundry superintendent. He was subsequently employed as general superintendent, Clark Equipment Co., Buchanan, Mich., and foundry engineer, Beardsley & Piper Co., Chicago. During the recent war he was associated with Kelsey-Hayes Wheel Co., Detroit.

♦ ♦ ♦

A. E.McRae Smith has been put in charge of the foundry consulting activities of Keighley Laboratories Ltd., consulting metallurgists and foundry specialists, Keighley, England. Mr. Smith was formerly associated with the development and research department of the Mond Nickel Co. Ltd.

♦ ♦ ♦

Dixon C. Van Winkle has joined the eastern sales staff, the Velsicol Corp., Chicago, with headquarters in New York. Mr. Van Winkle, a graduate of Rutgers University, was formerly affiliated with the Kellex Corp. in the development and production of the atomic bomb.

♦ ♦ ♦

Frank M. Moorman, recently released by the Army with the rank of lieutenant colonel, has returned to his former position as manager of the Indianapolis office of Republic Coal & Coke Co., Chicago.

♦ ♦ ♦

Don A. Lawless has been named to head the new technical service department of the Aluminum Sales Division of Reynolds Metals Co., recently established in Louisville to handle growing requirements for technical information. Mr. Lawless has been material engineer in charge of the specifications section of the Metallurgical Department of the company since 1941.

♦ ♦ ♦

C. A. Matheny has been appointed director of a new manufacturing development division recently organized by Caterpillar Tractor Co., Peoria, Ill., which will operate as a section of the general planning department for improvement and development of manufacturing processes that originate in various departments throughout the plant. Mr. Matheny formerly served as a factory superintendent at the Peoria plant and as works manager of Caterpillar Military Engine Co.

♦ ♦ ♦

Frank B. Eliason has been made vice president, Pennsylvania Foundry Supply & Sand Co., Philadelphia. Mr. Eliason has been associated with the sales department of the company for the last 12 years, where he will continue his activities with increased sales supervision. **Horace G. Stults** has joined the company's sales organization. Mr. Stults has spent 15 years in the foundry supply and equipment industry in eastern Pennsylvania, New York and Maryland, where he is well known.

♦ ♦ ♦

Arthur C. Eckborg has been appointed manager of the western district of National Crucible Co., Philadelphia, with headquarters at 56 West 112th St., Chicago. Mr. Eckborg, until recently, was connected with Central Steel & Supply Co., in Chicago, representing Ross Taconey Crucible Co. in the Chicago district.

♦ ♦ ♦

R. M. Wilson Jr. has been appointed a welding engineer in the technical service section of the Development and Research Division, International Nickel Co. Inc., at New York. Mr. Wilson, a graduate of Cornell University, was formerly welding engineer at the Bloomfield, N. J., works of the General Electric Co.

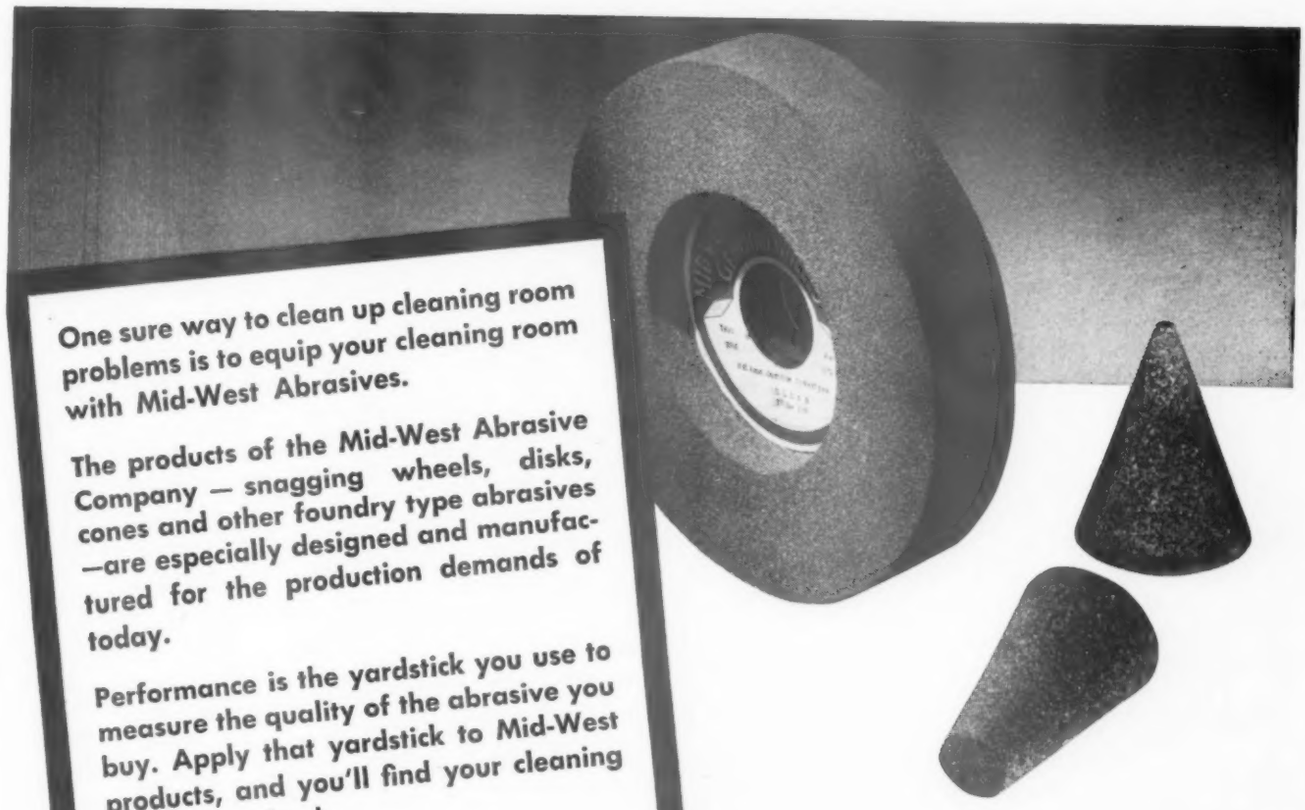
♦ ♦ ♦

C. E. Bales, vice president, Ironton Fire Brick Co., Ironton, O., has been appointed to the Labor-Management Relations Committee of National Association of Manufacturers.

♦ ♦ ♦

Harry Scullin, chairman of the board of directors, Scullin Steel Co., St. Louis, recenty was awarded the gold emblem of the Army Ordnance Association by the St. Louis post of that organization.

(*Concluded on page* 134)



One sure way to clean up cleaning room problems is to equip your cleaning room with Mid-West Abrasives.

The products of the Mid-West Abrasive Company — snagging wheels, disks, cones and other foundry type abrasives —are especially designed and manufactured for the production demands of today.

Performance is the yardstick you use to measure the quality of the abrasive you buy. Apply that yardstick to Mid-West products, and you'll find your cleaning problems solved.

Switch to Mid-West today!

CLEAN UP WITH MID-WEST ABRASIVES

MID-WEST ABRASIVE CO.

Manufacturers of DEPENDABLE Abrasives

OWOSSO, MICH. • DETROIT

ROCHESTER, PA.

MAN-TO-MAN on the Molder's Bench

"Personable Foundries"

By RALPH L. LEE

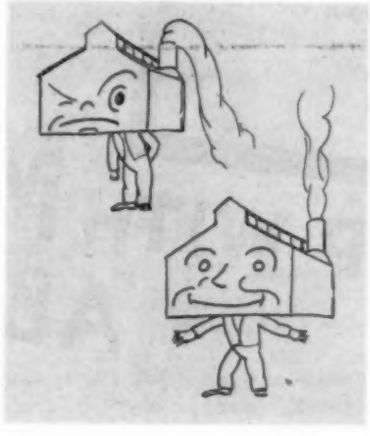
IT HAS often struck me that organizations have personalities just like homes or people. When visiting some you are made to feel at home no matter who you are, time flies and you hate to think of leaving; and on the other hand there are those where you feel out of place, where time drags and you unconsciously keep looking at your watch.

I have visited so many foundries and factories that I feel I can sense the personality of an organization the minute I walk through the front door. Take one case not so long ago, when I managed to get clear up to the reception desk without the fellow sitting there even looking up from his crossword puzzle. When he finally did condescend, he looked at me with an expression which said just as plain as words, "I know darned well you've got the wrong place and you *would* make your mistake on my busy day."

After registering my name and my reason for bothering him, he whispered out of the corner of his mouth into the phone, while eyeing me suspiciously in the meantime. He actually looked hurt when he found I really was expected. Following his marching orders, I climbed the stairs, turned left and opened the second door to the right on a gal who kept right on typing until she finished the line she was on before she looked up. She, too, looked pained at being bothered on her busy day.

While the Boss' words said he was glad to see me, I could see or feel that, down inside, his heart wasn't in what he said. It seemed to me every place I went through that plant almost everyone looked as though he were carrying a chip on his shoulder, fully expecting someone to knock it off any minute.

Later, I discovered this outfit wasn't getting along so hot—production was sagging, with costs and scrap soaring and plenty of labor trouble.



But when I visit most foundries the receptionist usually sees me the minute I open the door and greets me as though he had been waiting for me to arrive and just a little put out that I hadn't come long before this. The secretaries meet you the same way, so does the Boss, the foremen and the boys out in the plant. No matter where you go in an organization with a personality like this, you see people meeting each other as though they expected something good to come of it —there's a healthy swing to things. It must be more than a conicidence because I believe I have never run into a single organization with a wholesome and friendly spirit like this that wasn't doing a bang-up job and making some money for everybody too.

I used to wonder at the marked differences in organizations and what the source of either kind could be. Time and time again, I thought I had my finger on the answer only to find it wouldn't hold water in every case. Then, one day I began to think of the personalities of both kinds of organizations and compare them with the personalities of the top bosses running these outfits. It suddenly dawned on me that *the personality of an organization is a reflection of the personalities of the top people who run it.*

If such top people meet each other with dead pans and chips on their shoulders, if they are interested only in grinding their own personal axes with no regard for the feelings, rights or pride of the other members of their staff, then sooner or later this same sort of thing is going to filter down through the entire organization to its humblest member. And as long as this poison stems and is fed from the top there is little anyone down the line can do about it.

Of one thing I am certain, good personal relations cannot be sprayed on an organization, neither can they be bought even with the highest pay, nor with tiled shower and locker rooms or cafeterias, bowling tournaments, plant papers or annual picnics. Mutually profitable employee-employer relations must start at the top with example which will spread like an appealing style until anyone who doesn't know how to behave, or won't, will be as much out of style and out of place as a mustache cup. And of another thing I am equally certain: No organization can measure up to its possibilities without good, wholesome employee relations based upon a sincere respect for the dignity and pride of each individual.

(*Concluded from page* 132)

for his distinguished service to industrial preparedness. **Col. Clyde H. Morgan,** chief of the St. Louis Ordnance District, was awarded the Legion of Merit for his work as chief of the Ordnance Aircraft Service at Wright Field, Dayton, O., a post he held before going to St. Louis.

Joseph G. Paule has been elected to the board of directors, Wilson Foundry & Machine Co., Pontiac, Mich. Mr. Paule, who has served as secretary-treasurer since joining the company in 1937, will continue in that capacity. He was formerly with Owens-Illinois Glass Co., Toledo, O.

William F. Newton has been named manager of market research and development for Columbia Chemical Division of Pittsburgh Plate Glass Co., Pittsburgh. Mr. Newton, a native of Norfolk, Va., was graduated from the University of California. He joined the division's research staff in 1941.

● The trend is strong toward use of carbon for blast furnace linings. Why? Just consider the valuable advantages of this basically different kind of lining material—

1 Lasts indefinitely!

A properly-installed carbon block lining in a blast furnace should last indefinitely. This results from the remarkable physical properties of carbon: no melting point, low thermal expansion, highly resistant to thermal shock, not wet by molten metals, immune to metal and slag attack, mechanical strength maintained at high temperatures.

2 No Salamander!

Years of experience with carbon linings bears this out. Consider what a saving this feature, alone, can mean to you.

3 Fast, easy to install!

One carbon block can take the place of from 50 to 1000 nine-inch firebrick, depending upon the size of the block. Overall installation time is thus greatly reduced.

Interior of hearth lining looking toward iron notch. Blocks may be of any size desired up to 24x30x180 in.

4 Economical in long run!

Operating experience is proving that carbon linings are definitely more economical in the long run . . . as is evident from the features outlined at left.

WHATEVER YOUR PROBLEM —CONSIDER CARBON OR GRAPHITE

Get more details:

Engineers at National Carbon Company, Inc., will be glad to supply you with full available information on all phases of installing a carbon lining. Write today **to Dept. FY.**

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Foundry DEVELOPMENTS

SUBCONSCIOUS fear of the foundryman making castings with intricate passages that a core wire or two may be left behind in cleaning and cause trouble later, may be a thing of the past, and difficulties in removing rods from some castings may be eliminated if some experimental work now being conducted is successful. Investigation concerns the application of resins or what more popularly are called plastics to replace steel core wires. Idea presumably is to develop a material which will be stiff enough to provide the necessary support to the core under elevated temperature conditions, but will disintegrate at higher temperatures and nothing will be left in the passage when the core sand is shaken out.

• • •

A FIRM is reported to have developed several bright dip formulas which eliminate the serious hazards present in conventional formulas containing nitric and sulphuric acids. It is claimed that the new formulas do not generate offensive fumes, the solutions are easy to prepare, and the danger of accidental splashes on the skin is eliminated. Cost also is said to be less than the conventional formulas. Various formulas are available to provide brilliancy, a speedy dip, or an economical dip.

• • •

GENERAL Electric Co. engineers are using a chrome-cobalt alloy which forms parts of the gas turbine as a temperature indicator after various temperature measuring devices failed to record faithfully the intense and varied heat created by the turbine wheel whirling at more than 1000 mph. The chrome-cobalt alloy like most metals and alloys changes color when heated due to oxidation. However, unlike the others this alloy oxidizes so slowly at higher temperatures that each color change occurs regularly at 25° intervals, thus permitting an actual graduated color scale according to temperature. Strangest characteristic of the alloy according to General Electric engineers is that after it completes one order or scale of colors it reverts back and repeats these colors in a second, higher range of temperature. On the basis of 1 hr heat treatment the alloy at 500 C turns light straw color, at 525 C a straw color, at 550 C bronze, at 575 C purple, at 600 C dark blue, etc. until at 700 C it turns light blue. Theoretically it should turn gray at 725 C, but instead it reverts to the light straw color, and begins the progression of colors over again. The alloy turns light blue in the second scale when it reaches 900 C. and begins to show graying tendencies at 925 C.

• • •

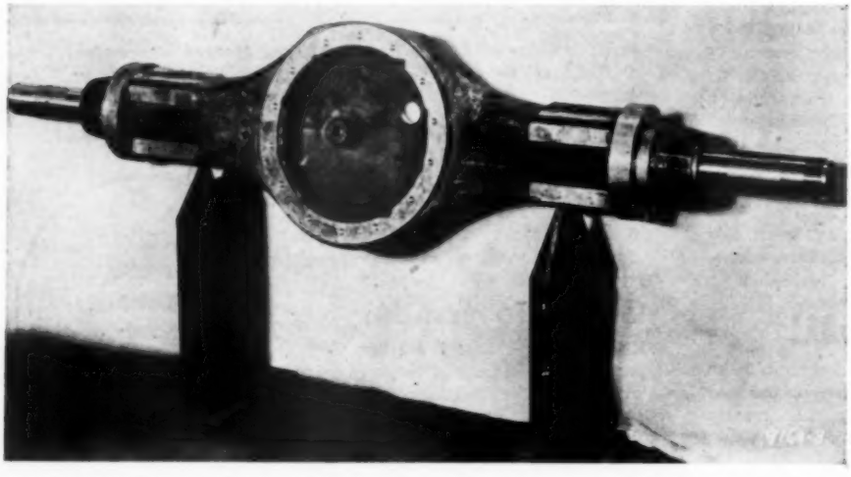
FIRST industrial application of one of the newest electronic devices—the 20,000,000-volt betatron which has been in use for more than a year in a government arsenal—was disclosed recently in joint releases by the University of Illinois and Allis-Chalmers Mfg. Co., who co-operated in making the betatron available for industry. Generating x-rays more powerful than any ever before used in commercial radiography, the betatron enables engineers to take pictures through 15 in. of solid steel. Through use of the machine minute hidden defects if present, may be detected in heavy forgings and castings.

• • •

ATTENTION is drawn forcibly to the sketchiness of the present state of knowledge relative to the effect of traces of residual elements and gases on cast ferrous alloys in a recent address by Dr. James E. Hurst, eminent British metallurgist, before the Staffordshire Iron & Steel Institute, and published in the Dec. 27, 1945, issue of *Foundry Trade Journal*. Illustrating his discussion with a number of cast irons similar in chemical analysis he states: "With the knowledge that the structural character can be modified very considerably by the presence of residual or trace elements, it will be clear that the understanding of such differences in behavior or structure can never be complete without knowledge of the nature, character and amounts of such extraneous elements present. Even if it were possible, no attempt is made to provide an explanation of the differences in behavior recorded, nor must it be assumed that in these cases the differences are due to residual elements and dissolved gases.

• • •

PRACTICALLY everyone is familiar with the word "homogenized," particularly with reference to milk, and knows that the milk is processed so that the cream does not rise to the top of the bottle. Process consists of breaking up the large globules of fat into such minute subdivision that it remains in suspension in the remaining fluid. While it might appear that there is a wide gap between milk and metals, many will be surprised to learn that experimental work is being performed to adapt the process to the homogenization of molten metal. The idea is to distribute the alloying elements more uniformly. E. B



CAST ALUMINUM REAR AXLE developed by engineers of Timken-Detroit Axle Co., Detroit, in close co-operation with engineers of Aluminum Co. of America weighs 220 lb less than the usual construction. Designed for heavy-duty trucks it also comprises aluminum hubs and brake shoes and it is claimed that the reduction in unsprung weight should lengthen tire life; improve riding qualities particularly when lighter loads are carried at high speeds, and permit carrying more pay load

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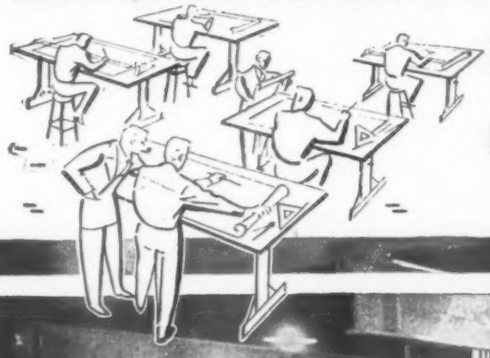
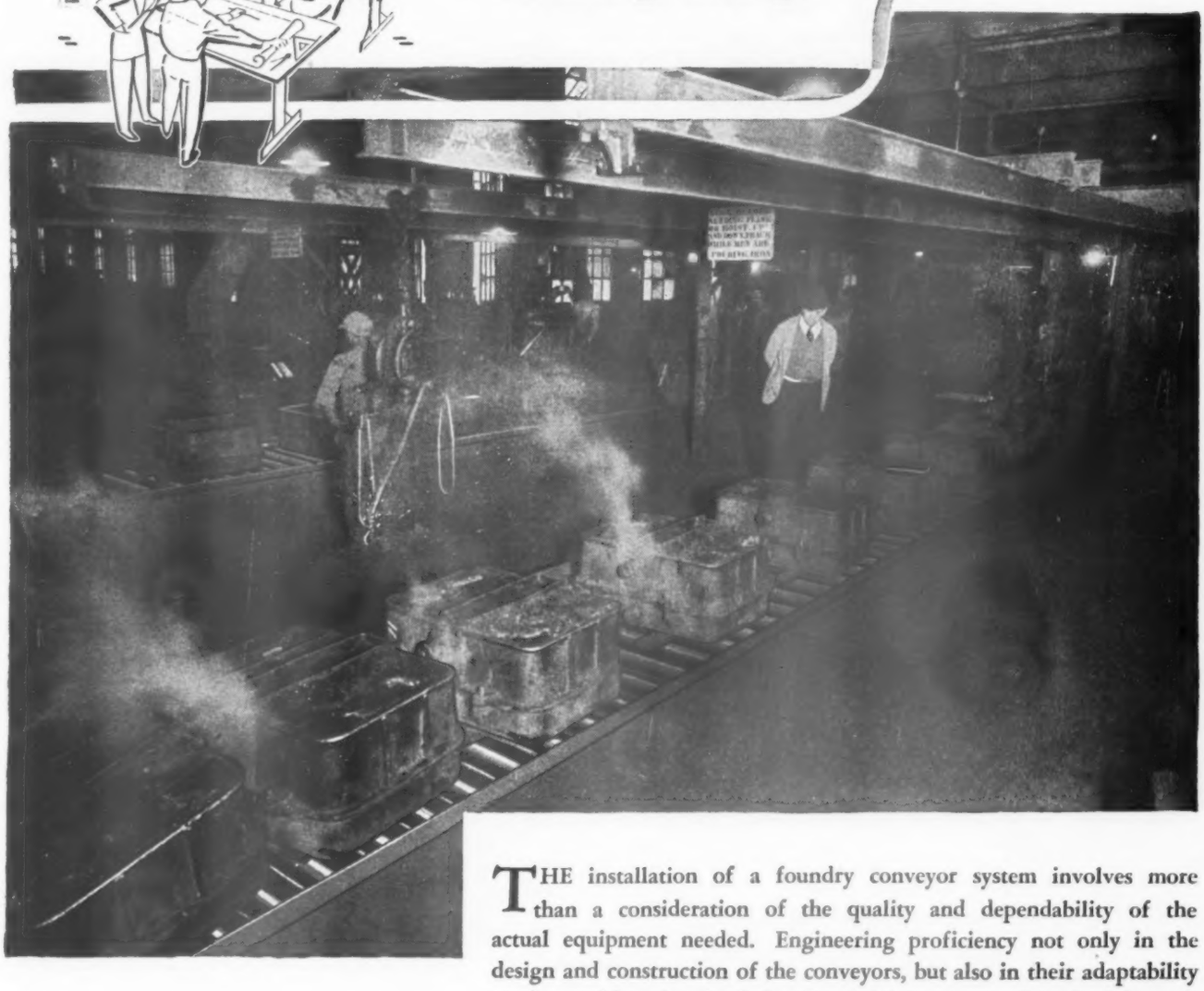
it's what you really buy!





Pouring lines of Logan heavy duty rolls handle large molds through pouring and to shake-out. Rolls are equipped with shot shields to protect bearings from sand and spilled metal.

THE installation of a foundry conveyor system involves more than a consideration of the quality and dependability of the actual equipment needed. Engineering proficiency not only in the design and construction of the conveyors, but also in their adaptability to the problem involved, is of equal importance. Proof of Logan's ability to profitably engineer conveyor systems to countless handling problems is in evidence in many of the nation's major foundries. Call in the nearest Logan engineer, or write for literature.

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PRESERVE FREE ENTERPRISE

Logan Conveyors

PUT *FLOW* INTO PRODUCTION

Around DETROIT

By A. H. ALLEN
Detroit Editor, The Foundry

Foundries moving ahead with plans for expanded melting facilities despite drabness of current production outlook . . . Cupola builders quoting seven to eight months on deliveries

EVEN though the production outlook in the foundry field is particularly bad at this writing, and daily is becoming worse in the face of dwindling supplies of pig iron and coke, planning for the future remains bright, and expansion of melting facilities moves ahead actively. As proof, consider that builders are now quoting seven and eight months on cupola deliveries.

Among the captive automotive foundries, General Motors divisions are ahead of their competition as far as new construction is concerned. The Cadillac installation is being lined up for an early completion, as soon as current production can be shut off for a few weeks to allow the changeover. Pontiac will take delivery shortly on its two new 102-in. cupolas to be erected in an extension to the gray iron foundry. Four other replacement units will wait on installation of the two new stacks, the idea probably being that the job can be facilitated by erecting the cupolas along with other steelwork.

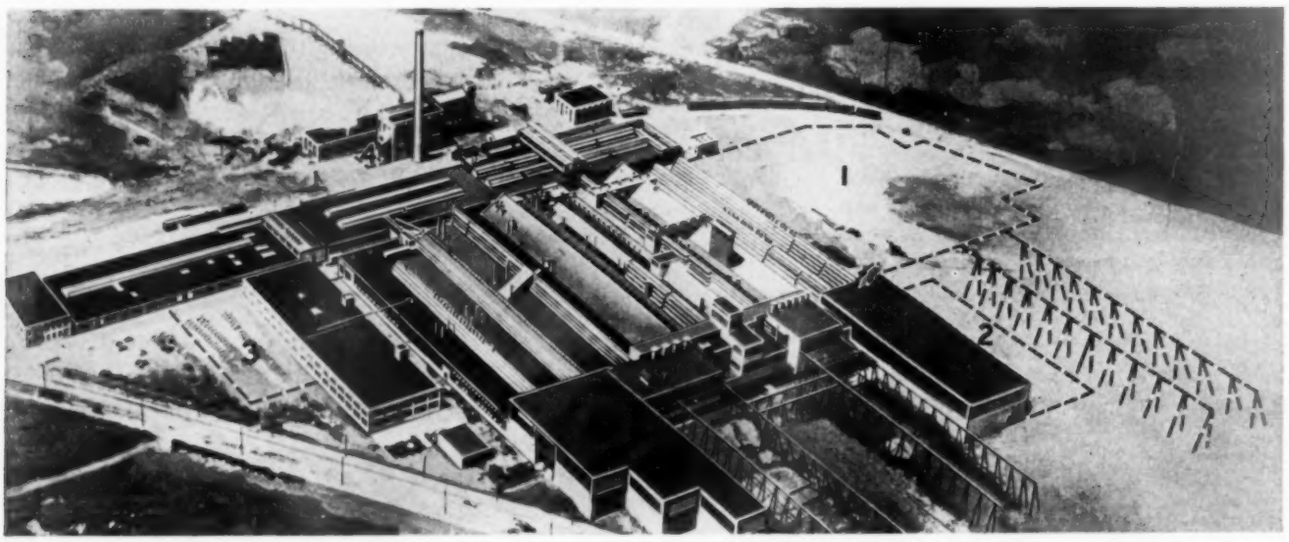
The major expansion at Chevrolet Gray Iron, involving six new cupolas and a host of related equipment has been deferred in the interests of speeding up delivery of equipment to the Wheland Co. in Chattanooga, Tenn., where six new cupolas, cranes, charging equipment, conveyors and a lengthy list of machinery and material for mechanized casting operations are on order for delivery around June 1. While General Motors is helping on this program, and has even deferred one of its own projects in favor of getting priority, there is said to be no actual ownership of the operation involved. About the only word yet given out and this is unofficial, is that the company is gearing up to produce 15,000 sets of brake drums daily for Chevrolet.

Some equipment interests are now speculating on whether the foundry may not be planning to handle the entire castings requirements for the Chevrolet light car project. The push being exerted on the Chattanooga expansion would suggest this, but of course no information has yet been released on just what these casting requirements may involve. If the engine to be used in the car is a cast aluminum and steel sleeve type, there would be no need for cylinder block and head castings in the conventional gray iron design. Of pertinent interest is the fact the present Chevrolet Gray Iron Division has changed its letterheads to read "Chevrolet-Saginaw Gray Iron Foundry," indicating a new branch may be in the works.

The two plants being built in Cleveland to manufacture the light car do not have any foundry capacity, and presumably the delaying of the long-planned extension at Chevrolet Gray Iron would mean that this plant is not counted on as a source for the light car. One thing is certain: With Arnold Lenz, a capable foundry engineer and executive of long experience in charge of the entire project, there will be no slighting of castings facilities. As the program now stands, initial production of the new light car cannot be expected much before next summer.

Strangely enough, despite this flourish of foundry activity in GM, other large producers like Ford and Chrysler seem unusually quiet on this score. There has been some replacement of melting equip-

(*Concluded on page* 140)

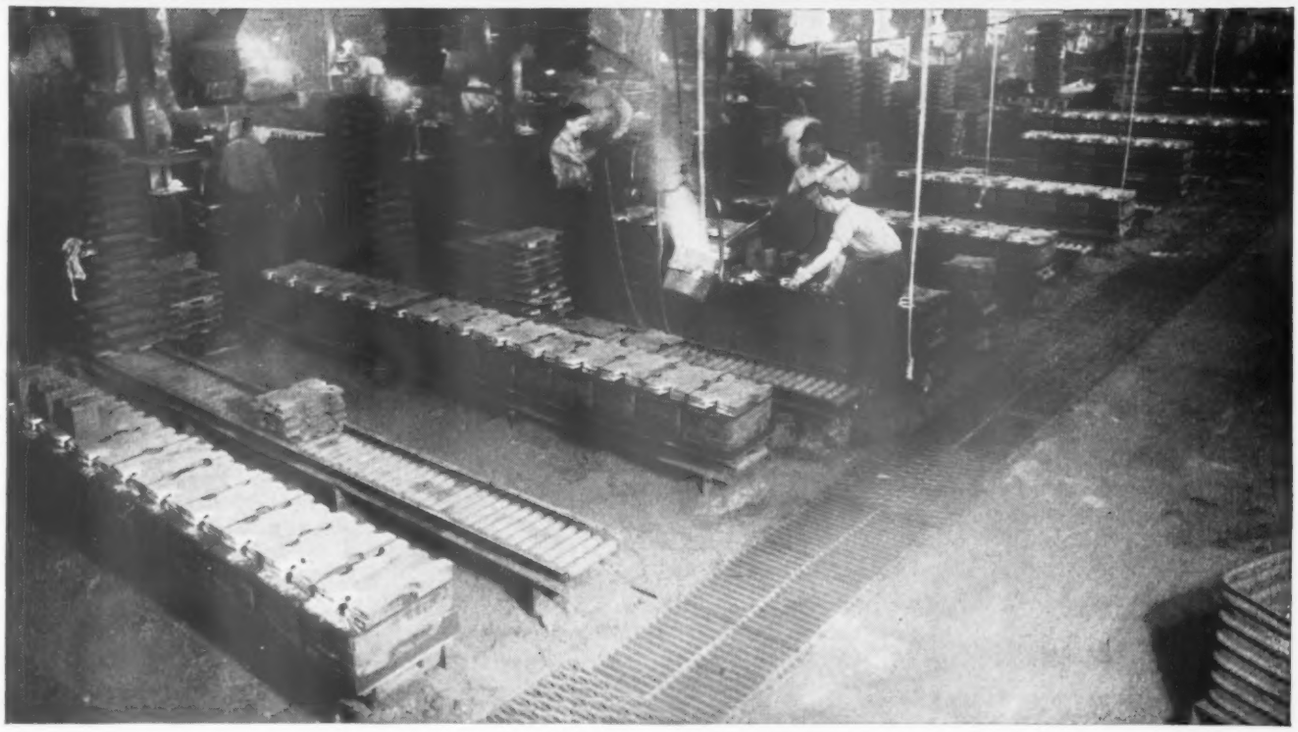


CHEVROLET EXPANDS FOUNDRY: Additions being made to Chevrolet Gray Iron Foundry, Saginaw, Mich., will enlarge the plant approximately 50 per cent. New construction, as shown by numbers on the accompanying sketch, includes the following: 1—New cupolas; 2—Sand storage and conditioning; 3—Pattern shop; 4—Power house addition

Mathews

ROLLER CONVEYERS

Engineered to serve Production



Roller Conveyer for foundry application should be designed to withstand severe service. The rollers must be rugged and free-running, and the bearings should be protected from grit and dirt. If the conveyers are located in a pouring zone, shotguards should be used on the ends of the rollers. Mathews Engineers have devoted much time and effort toward developing an outstanding Roller Conveyer design for foundry application. There is a Mathews Engineer operating in your vicinity. Ask him about Roller Conveyer and the many other types of Mathews Conveyers which have been engineered for foundry service. He will show you why Mathews Conveyers are able to stand up under the most severe foundry applications. Write or wire today.

Mathews Conveyer Company

ELLWOOD CITY, PENNSYLVANIA

(*Concluded from page* 138)

ment at the Rouge plant, but Chrysler has undertaken nothing in the way of additional capacity. The gray iron unit at the Dodge Main plant has been redesigned, re-equipped and otherwise refurbished so many times that not much else can be done within the limited confines there. The perennial rumor of expansion at Marysville has not appeared recently, while foundries at New Haven and Muskegon continue to be looked to as principal outside sources, which would not likely be able to accommodate much increase in tonnage for Chrysler.

• • •

OFFICIALS of Wilson Foundry & Machine Co., Pontiac, deny rumored changes in management and control of that organization, other than the addition of a new director to the board. Wilson Foundry has had a long and distinguished history as an important supplier of automotive castings. It was started back in 1914 after purchase of the plant and property by Dave R. Wilson and his late brother, C. B. Wilson, from the Flanders interests. The two, prior to that time, had been associated with Oldsmobile, and later with Ferro Foundry & Machine Co. A heavy production program was launched, principally to supply castings for the Willys-Knight automobile. Gray iron, aluminum and bronze were melted, output of the former having run at one time as high as 550 tons per day, and aluminum up to 120,000 lb per day, bronze around 5 tons daily. Some of the initial work was done in a tent erected outside the plant, pending additional construction.

Operated Through War Years

Dave Wilson left the plant about 1933 to take over the direction of Willys in Toledo, and he retired from this position several years ago, now spending his time in California. Meanwhile, W. O. Leonard, his father and others took over control of the foundry in 1937 and operated it through the war years. The company currently is producing engine blocks for Continental Motors to be used in engines which are being supplied Kaiser-Frazer Corp.

Wilson Foundry is continuing production of the small 2½-hp gasoline engine called the Whizzer, for installation on bicycles, and described briefly in these columns some months ago. It is also manufacturing aluminum garage doors, and supplying castings for certain agricultural implement manufacturers.

During the war, a $1.5 million modernization program was carried out under DPC loan, involving a new coreroom, molding lines and changes in melting equipment. This installation is still being operated and negotiations are proceeding with the RFC leading to its purchase by the company. L. B. Thomas, Wilson works manager who left the company recently, has been transferred to the Ford gray iron foundry.

• • •

New management of Detroit Gray Iron Foundry has moved operations of this company into profitable ground, according to trade comment. A further expansion program is contemplated, and with the amount of automotive die business to be placed in this district in the next few years, the company should make further progress. Kenneth L. Clark, formerly associated with the Forging & Casting Division of Allegheny Ludlum Steel Corp., Ferndale, is now sales manager for Detroit Gray Iron.

Hugh Martin, one-time head of DGI, is engaged in putting up a downriver building for operation as a gray iron foundry. He has acquired a used cupola to be installed in the plant, and hopes to have operations under way this summer. The company is listed as Martin Foundries, 2215 South Schaefer Road, Melvindale, and advertises production of gray iron, semisteel, alloyed iron and jobbing castings.

OBITUARY

WILLIAM E. GOEBERT, superintendent of the Bowler Foundry Co., Cleveland, died in that city, May 4. Mr. Goebert was born in Philadelphia, where he learned the molder's trade under his father. He went to Cleveland in 1937 as superintendent of the Johnston & Jennings Co. and two years later joined the Bowler company. Mr. Goebert was active in the Northeastern Ohio Chapter of the AFA, serving as vice president of the chapter in 1944-45.

• • •

Harry Winterton, managing director of William Cumming & Co. Ltd., Glasgow, Scotland, died Mar. 26. Mr. Winterton had been associated with the firm for over 40 years and his business trips took him into practically every foundry in Great Britain as well as Canada and the United States. He joined the Institute of British Foundrymen in 1906 and was elected its president in 1936, having been president of the Scottish branch in 1929. He was also a past president of the Foundry Trades Equipment and Supplies Association, as well as the Refractories Association.

• • •

Frank S. Lampard, 47, engineer of the Mathews Conveyer Co., Elwood City, Pa., died Apr. 16. Mr. Lampard was well known for his work in designing conveying systems, especially in the metal working industries, where he specialized in the intricate mechanisms which are now a part of the modern conveying unit.

• • •

Jesse D. Stoddard, 74, vice president and general manager, the Detroit Testing Laboratory, Detroit, died in that city, May 8. Educated at Grinnell College, Mr. Stoddard served as chemist with Griffin Wheel Co., Chicago, and later with American Radiator Co. He had been associated with Detroit Testing Laboratory since 1904. Mr. Stoddard was one of the founders of the Detroit Foundrymen's Association, now the Detroit Chapter of the AFA.

• • •

LeRoy G. Whitmer, 74, vice president and treasurer, American Foundry & Furnace Co., Bloomington, Ill., died Apr. 22 in that city. He retired from the presidency of the company several years ago to assume his recent post.

• • •

Arthur D. McCaughna, 56, president and general manager of the General Foundry & Mfg. Co., Flint, Mich., died Apr. 4, in that city. Mr. McCaughna was connected formerly with General Motors Corp., Nash-Kelvinator Corp. and Borg-Warner Corp.

• • •

William H. Groah, 81, owner of the Port Republic Foundry, Port Republic, Va., died recently in East Rockingham, Va. Mr. Groah had owned and operated the foundry for the last 63 years.

• • •

Albert W. Balderson, 70, one of the founders of the Beloit Foundry Co., Beloit, Wis., died there recently.

• • •

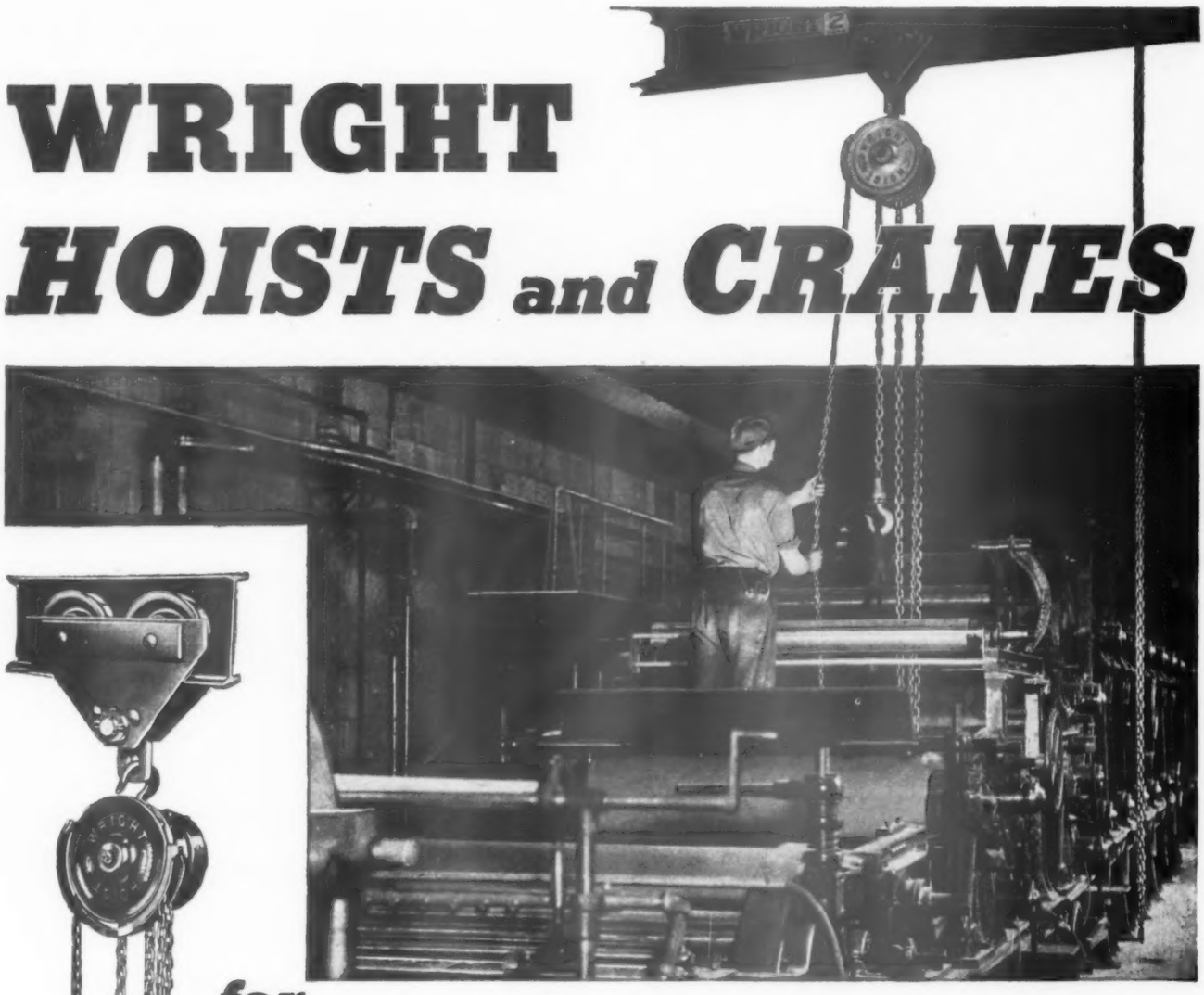
Ralph S. Dietterich, president, Keystone Pattern Works, Buffalo, died Apr. 15 after an illness of six months.

Book Review

Foundry Sands and Mold Materials, Report No. 2, paper, 160 pages, 5¼ x 8¼ inches, published by Northern California Chapter, American Foundrymen's Association, 533 Rialto Bldg., San Francisco 5. Price $1.

Following its activities which resulted in publication of Report No. 1 about a year ago, the Foundry Sands and Mold Materials Committee of the Northern California Chapter, AFA, went more extensively into its field and through close co-operation developed more information comprising Report No. 2. The committee deserves great credit for the presentation of this material. Primarily concerned with the sands available to Pacific coast foundrymen, the book discusses various molding sand, facing sand and core sand mixtures used in a number of foundries producing ferrous and nonferrous castings.

WRIGHT
HOISTS and CRANES



for economical material-handling

Never before have manufacturers stood in such need of labor-saving — labor-aiding equipment, and production efficiency. Not only do you need a Wright traveling crane which will really put your ceiling to work, but you need Wright's years of experience to help you cut costs and speed production.

Wright material-handling equipment (cranes, hoists, and trolleys) is built in a wide range of capacities and to meet the most exacting specifications. Call your local Wright distributor (see metropolitan classified telephone directory). If your problem is special he will call in a Wright engineer. In the meantime, write for Wright Specification Bulletin, or Catalog 12-D.

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In Business for Your Safety

Famous CORNELL FLUXES a

Famous CORNELL CUPOLA FLUX

IN EXCLUSIVE SCORED BRICK FORM

The use of the right amount of pig, scrap, limestone and air in the cupola is extremely important but it does not mean you get the best castings. No matter how careful you are to eliminate guesswork, your castings cannot be of the highest quality until foreign matter is removed from the molten metal.

FAMOUS CORNELL CUPOLA FLUX CLEANSES METAL, MAKES IT HOTTER AND MORE FLUID, CASTINGS ARE DENSER GRAINED, SOUNDER, STRONGER AND EASIER TO MACHINE.

Famous Cornell Cupola Flux keeps cupolas clean. In most cases considerably less limestone is needed, consequently there is a definite saving in coke and longer lasting brick in the melting zone. You always get a clean drop. Maintenance labor is greatly reduced.

Famous Cornell Cupola Flux comes to you in an easy-to-use, exclusive Scored Brick form. See advantages at left.

For full information, write for Bulletin No. 46-B

THE *Brick* FORM HAS THESE ADVANTAGES

Famous Cornell Cupola Flux takes but a few seconds to use, saving time and labor

Promotes accurate measurement—correct quantity of flux per charge. You simply toss in one brick to each ton or break off a briquette (quarter section) for each 500 lb. charge of iron in cupola.

NO LOSS UP THE STACK!

None of Famous Cornell Cupola Flux blows out with the blast. Being in brick form it stays in melting zone until entirely consumed, hence you obtain the fullest iron-cleansing efficiency

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Famous CORNELL BRASS FLUX

CLEANSES MOLTEN BRASS, even when the dirtiest brass turnings are used.

Castings come tougher, sounder and denser grained, which is vitally essential in the manufacture of any casting that must stand the pressure test and take an extra fine finish.

Several elements in this flux combine to gather the gases, while the metal is being melted and cause them to form into balloon shaped bubbles and rise to top of metal in the form of slag which is very essential as a cover to retain heat during transfer to molds.

Less tin and other metals are required.

Crucible and furnace linings are preserved.

Write for Bulletin No. 46-A

Famous CORNELL ALUMINUM FLUX

CLEANSES MOLTEN METAL, thereby playing an important role in the production of sound tough castings.

More scrap can be used without danger of dirt, porous places or spongy spots.

Thinner yet stronger sections can be poured.

NO FUMES! Exclusive formula prevents obnoxious gases, improves working conditions.

Metal does not cling to dross.

Write for Bulletin No. 46-A

Famous CORNELL LADLE FLUX

KEEPS LADLES CLEAN AND CLEANSES IRON. Before tapping cupola, place a few ounces of this flux in bottom of ladle. It thoroughly cleans the iron, bringing any impurities to top of metal in the form of a cake which is easily skimmed off.

If molds are some distance from cupola, a handful of our ladle flux sprinkled on top of metal acts as a cover and prevents chilling.

Famous Cornell Ladle Flux increases ladle life, reduces patching, etc.

FAMOUS CORNELL FLUXES

Trade Mark Registered

AFA MARKS ANNIVERSARY

As Convention Attendance Sets Record

(*Continued from page* 87)

to Past President Hyman Bornstein, Deere & Co., Moline, Ill., by Vice President Elect Max Kuniansky, Lynchburg Foundry Co., Lynchburg, Va.; the John H. Whiting Gold Medal was presented to Peter Blackwood, Ford Motor Co. of Canada, Windsor, Ont., by Past President Lester N. Shannon, Stockham Pipe Fittings Co., Birmingham, Ala., and the Peter L. Simpson Memorial Medal, recently established as an association award, was presented to Howard F. Taylor, Massachusetts Institute of Technology, Cambridge, Mass., by Past President Herbert S. Simpson, National Engineering Co., Chicago. A life membership in the American Foundrymen's Association was presented to Past Director Harold J. Roast, Canadian Bronze Co., Montreal, by Ralph J. Teetor, and a life membership in the association was presented to William J. Coane, Ajax Metal Co., Philadelphia, by Past President Lee C. Wilson, Reading, Pa. This life membership was accepted by Dr. G. H. Clamer, president, Ajax Metal Co., Philadelphia, on behalf of Mr. Coane, who was prevented from attending because of illness.

Pays Tribute To Foundry

General Armstrong paid tribute to the tremendous contributions of the foundry industry to successful war production. He told of the work of the Industrial College of the Armed Forces, and described the results of a recent seminar held in Washington by the college and a committee of representative gray iron foundrymen. A report of this seminar is presented on page 103 of this issue.

In conclusion, General Armstrong stated, "In the atomic age, with the universal destruction that is certain to follow the outbreak of war, the purpose of national defense must be to prevent wars. Anything that weakens industry or weakens our economic structure, by that much reduces our strength in the international arena. Therefore, if we are to avert war we must see to it that the Industry-Armed Forces teamwork is maintained at its most effective level. One of the most important groups with whom we shall labor in this field are the foundrymen."

• • •

HUMAN relations keynoted the meeting sponsored by the Committee on Foreman Training, Wednesday evening, at which Frank E. Wartgow, of AFA national headquarters, presided, and presented Steven G. Garry, Caterpillar Tractor Co., Peoria, Ill. Mr. Garry stated that industry has turned the corner from mass production to an era of human relations. In stressing need for trained leaders in the foundry industry he said that the foreman is the king pin and the course followed by the group under his supervision depends upon his ability to direct operations and to get along with individuals. Foundries must keep their supervision up-to-date as well as their equipment. The foreman training program is a means to this end.

In outlining training methods Mr. Garry explained that foremen can best be trained by a conference program. Men qualified by ability and leadership are selected and convene in small groups for discussion of group problems, finding solutions, and working them out together. A conference leader sees that everybody participates, and puts facts discussed to good use.

Fred J. Walls, AFA national president, and C. E. Hoyt, treasurer

William W. Maloney, AFA secretary, and Tom Makemson, secretary, Institute of British Foundrymen

An important fact brought out was that in many instances the men selected for the training need suggestions for working out relations problems more than actual foundry practice instruction. Who should attend the conferences depends upon the extent and scope of the program. The best program would include all foremen. Conferences of foremen from different departments for cross-section viewpoints, and of both old and young men for exchange of ideas, are important. Subject matter should be so diversified that discussion and organized debate result.

Keep Interest Stimulated

Executive co-operation does not mean that management affords the opportunity of the conference program, but it must keep interest stimulated within the group and realize that the program is training men who will benefit the entire organization.

The conference program stimulates new interests and changes old habits. It must continue year after year to keep those interests alive. A supervisor must know the problems of foremen under his management. Training programs offer a means of finding out such problems.

In the discussion which followed the talk, ideas were exchanged on results of programs established in various foundries, how individual problems were overcome and benefits received.

• • •

FIRST of the two-session Symposium on Engineering Properties of Gray Iron was held Wednesday morning, with R. G. McElwee, Vanadium Corp. of America, Detroit, presiding. Co-chairman was W. E. Mahin, Armour Research Foundation, Chicago, who presented a brief abstract of an extensive compendium of information entitled "The Engineering Properties of Gray Iron," which was prepared especially for engineers and designers.

Divided into five chapters the report gives data on general chemical and physical properties of gray iron; a review of the important properties present in the form of tables and curves; a guide

(*Continued on page* 146)

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(*Continued from page* 144)

on features of design; a tabulation of application of gray iron to castings, and a supplement covering the theories of physical metallurgy of gray iron. Indications are that the report will be available for distribution some time later.

Second session of the symposium was held Wednesday afternoon with R. G. McElwee and W. E. Mahin presiding. First paper on the program, entitled "Ductility and Elasticity of White and Gray Irons" by R. A. Flinn and H. J. Chapin, both of American Brake Shoe Co., Mahwah, N. J., was presented by Mr. Flinn. It pointed out that while white, mottled and gray irons popularly are considered brittle materials, they can be produced with definite elasticity and ductility as well as reproducible tensile strength and other properties. Also that the elastic and plastic constants cited may be equally as significant in determining casting performance as are tensile strength and hardness.

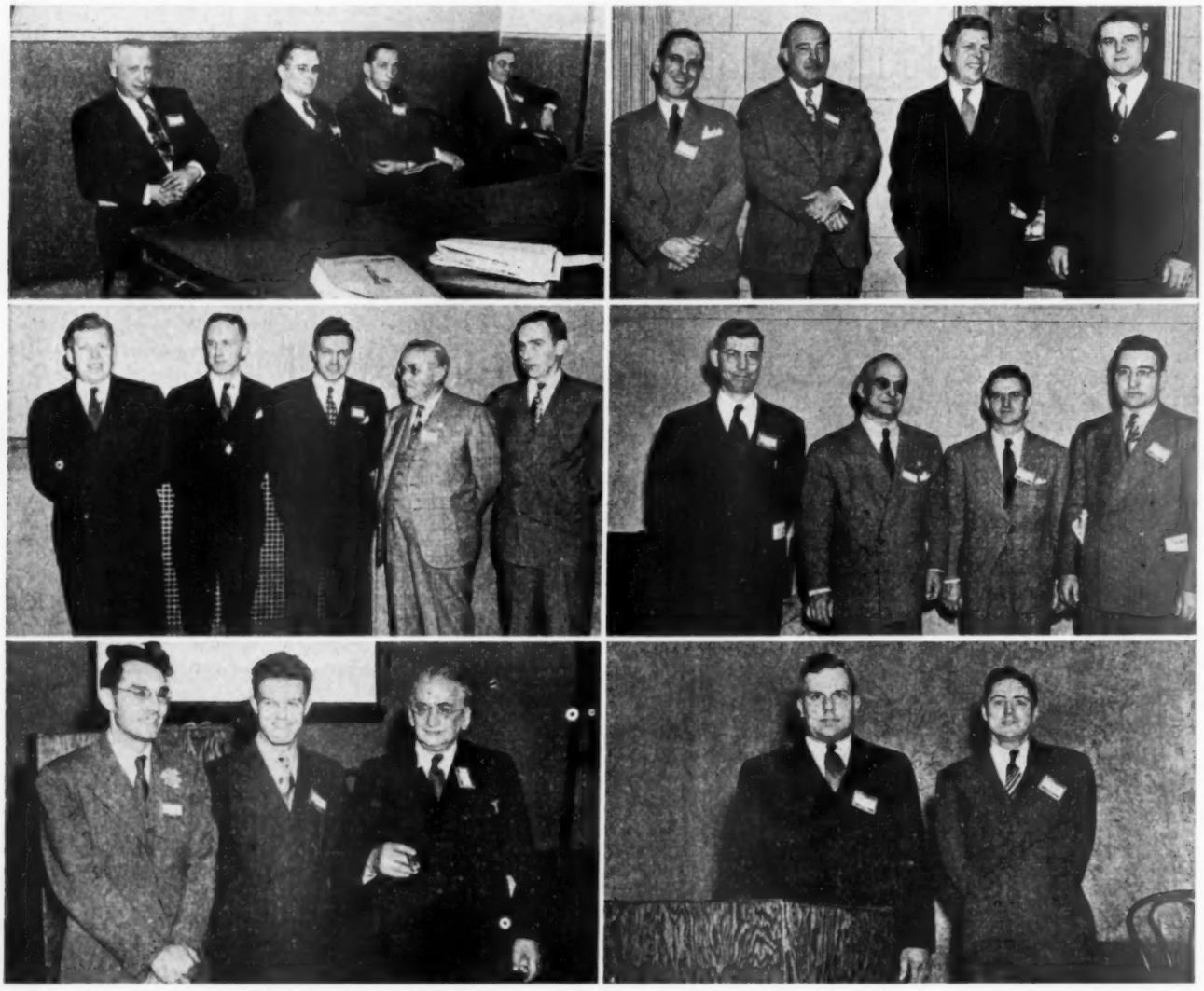
Second paper on "Gray Cast Iron Tensile Strength, Brinell Hardness and Composition Relationships," by T. E. Barlow and C. H. Lorig, Battelle Memorial Institute, Columbus, O., was presented by Mr. Lorig. Some of the conclusions reached were that in the absence of alloying elements, the tensile strength of gray iron in a 1.2 in. arbitration test bar is a function of composition expressed as total carbon plus one-third silicon or the carbon equivalent. Graphical presentation of the relationship between tensile strength and carbon equivalent may be utilized to indicate the machinability, wear resistance and other essential engineering properties. Tensile strength divided by brinell hardness gives a value which is a function of the carbon equivalent.

A paper prepared by Kenneth Geist, Allis-Chalmers Mfg. Co., Milwaukee, on "Effect of Carbon Equivalent and Section Size on Physical Properties of Gray Iron" was presented by W. A. Hambley of that company, and pointed out that as the section size increases the physical properties of an iron with a relatively high carbon equivalent decreases. Consequently, it is necessary to reduce the carbon equivalent as the section size increases.

Two other papers presented on the program were "Practical Considerations Affecting the Section Sensitivity of Gray Iron," by Henry C. Winte, Worthington Fump & Machinery Corp., Buffalo, and "Structural Control for Wear Resistance," by F. G. Sefing, International Nickel Co. Inc., New York.

Mr. Winte pointed out that the cooling rate has a profound effect on the physical properties of the resulting casting due to the structural changes involved. That is to say unless the volume area relationships of casting and test bar are similar, extreme care must be taken in trying to translate information obtained on one to the other. Often it is quite difficult to do that due to the fact that castings are nonuniform in section. Hence a compromise has to be

(*Continued on page* 148)



Some of the speakers and meeting chairmen who participated in the numerous technical sesions during the congress

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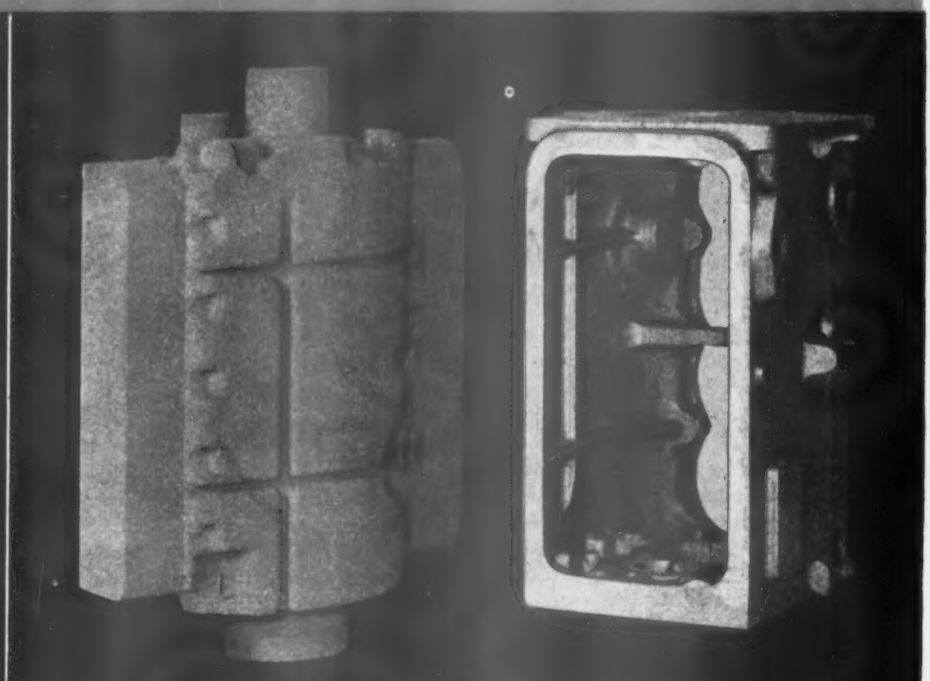

PARAPHRASING that old saying that "the proof of the pudding is in the eating," the illustration above shows the value of cores made with Krause Cereal Binder. At the left is a half section of a core for a gray iron housing. At the right is the finished casting. Notice the detail . . . the smoothness of surface . . . the elimination of surface finishing.

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(*Continued from page* 146)

effected so that the properties of the heavy and lighter sections prove suitable for the service.

Mr. Sefing said he believed that by proper control of graphite structure so that a random type with a pearlitic matrix is developed, it is possible to predicate wear resistance by examination of the microstructure. He also advocated use of inoculants to avoid occurrence of dendritic graphite structures which are notorious for their low wear resistance.

STEEL CASTING TECHNIQUE

Considered at Three Meetings

BORE Cracks in Cast Steel Valves and Fittings" was title of a paper contributed by H. F. Bishop, W. H. Johnson, Naval Research Laboratory, Washington, and H. F. Taylor, Massachusetts Institute of Technology, Cambridge, Mass., at the first of three sessions sponsored by the Steel Division. H. H. Blosjo, Minneapolis Electric Steel Castings Co., Minneapolis, and Charles Locke, West Michigan Steel Foundry Co., Muskegon, Mich., presided as co-chairmen.

According to Mr. Bishop, bore cracks occur after the barrel solidifies. Cause appears to be hot spots under the flanges, or contraction in the barrel section. To avoid these cracks, it is necessary to remove the hot spots by means of chills, or to eliminate the hindrance to contraction through use of cores which are hollow under the flanges. The speaker pointed out that cores must be made as strong as possible, yet must collapse readily after metal has solidified.

Doubt Effectiveness of Treatment

Difference of opinion exists over the usefulness of the homogenization heat treatment of cast steels. P. C. Rosenthal and J. G. Kura, Battelle Memorial Institute, Columbus, O., presented a paper outlining a research into the subject and concluding that effectiveness of the treatment is to be doubted. Mr. Kura asserted that the homogenization treatment which is carried out at temperatures higher than customary heat treatment, does not affect hardenability of the steel. Best temperature seems to be around 2200 F and held for long periods.

In discussion, C. E. Sims, also of Battelle Memorial Institute, stated that research on another subject had developed evidence supporting the author's conclusions. He said that the 2200° temperature required is impractically high and that the time of 20 or more hours also is unreasonable. The benefit to mechanical properties resulting from homogenization makes the treatment hardly worth while.

A paper, "Thermal Relief of Stresses in Steel Castings and Weldments," by C. R. Jelm and S. A. Herres, Watertown Arsenal, Watertown, Mass., reported an exhaustive study of the efficiency of stress relief and the best procedure to accomplish it. Mr. Jelm advised that heating to 1100 to 1200 F uniformly and holding for one hour per inch of section will relieve about 85 to 90 per cent of internal stresses. He also warned that in annealing, care must be exercised not to create new stresses.

Presenting the report of the committee on heat treatment of steel castings, E. R. Young, Climax Molybdenum Co., Chicago, commented that this group was more or less inactive during the war, largely because much of the investigational work on heat treatment had been confidential and some still is restricted. However, definite progress has been made toward getting optimum properties from heat treated castings. A new test has been devised to determine the treatment to provide hardness to the required depth. Molten salt treatment, Mr. Young said, offers some advantages in treating castings having variable sections. A main project to be reported in the full report of the committee will detail results of a questionnaire sent out to determine use of the end quench test for steel castings.

New Factors Involved

Considerations involved in the application of hardenability requirements in the steel foundry highlighted the Friday morning session of the Steel Division, a comprehensive paper on the subject being presented to an audience of 75 by Gosta Vennerholm, steel foundry metallurgist, Ford Motor Co., Dearborn, Mich. He was introduced by the chairman of the session, C. H. Lorig, Battelle Memorial Institute, Columbus, O., who was assisted by J. A. Rassenfoss, American Steel Foundries, East Chicago.

Mr. Vennerholm sought to show that in the development of new applications for steel castings, factors other than mere physical properties are coming to be involved, mainly at the insistence of customers who are arbitrarily setting up limits on chemistry and response to heat treatment, or hardenability. A committee of the Society of Automotive Engineers has been at work for some time in the development of hardenability specifications for steel castings, until recently largely restricted to rolled steel.

The speaker painstakingly reviewed the fundamentals of hardenability, particularly as related to the effects of deoxidizers, alloys, soaking time, quenching temperatures, etc. He offered some preliminary data developed in his laboratory on a rapid method for testing hardenability of steel in the liquid bath, so that proper adjustments could be made in manganese content to bring hardenability of the resulting casting up to requirements.

Methods of quality control in the steel foundry were outlined in a paper by J. W. Juppenlatz, Lebanon Steel Foundry, Lebanon, Pa. He pointed out that over the years the level of quality in the steel foundry industry has been increasing steadily, but to carry progress forward there must be increasing attention to chemical, metallurgical, physical and soundness characteristics, particularly the latter. He described new nondestructive equipment in the field of supersonics to provide quick indication of internal discontinuities in castings. He also emphasized the importance of proper repair welding procedures, means to obtain directional solidification, adequate process control, and careful attention to design problems.

Scheduled committee report on production of steel for castings, by C. E. Sims, Battelle Memorial Institute, Columbus, O., was not available for presentation.

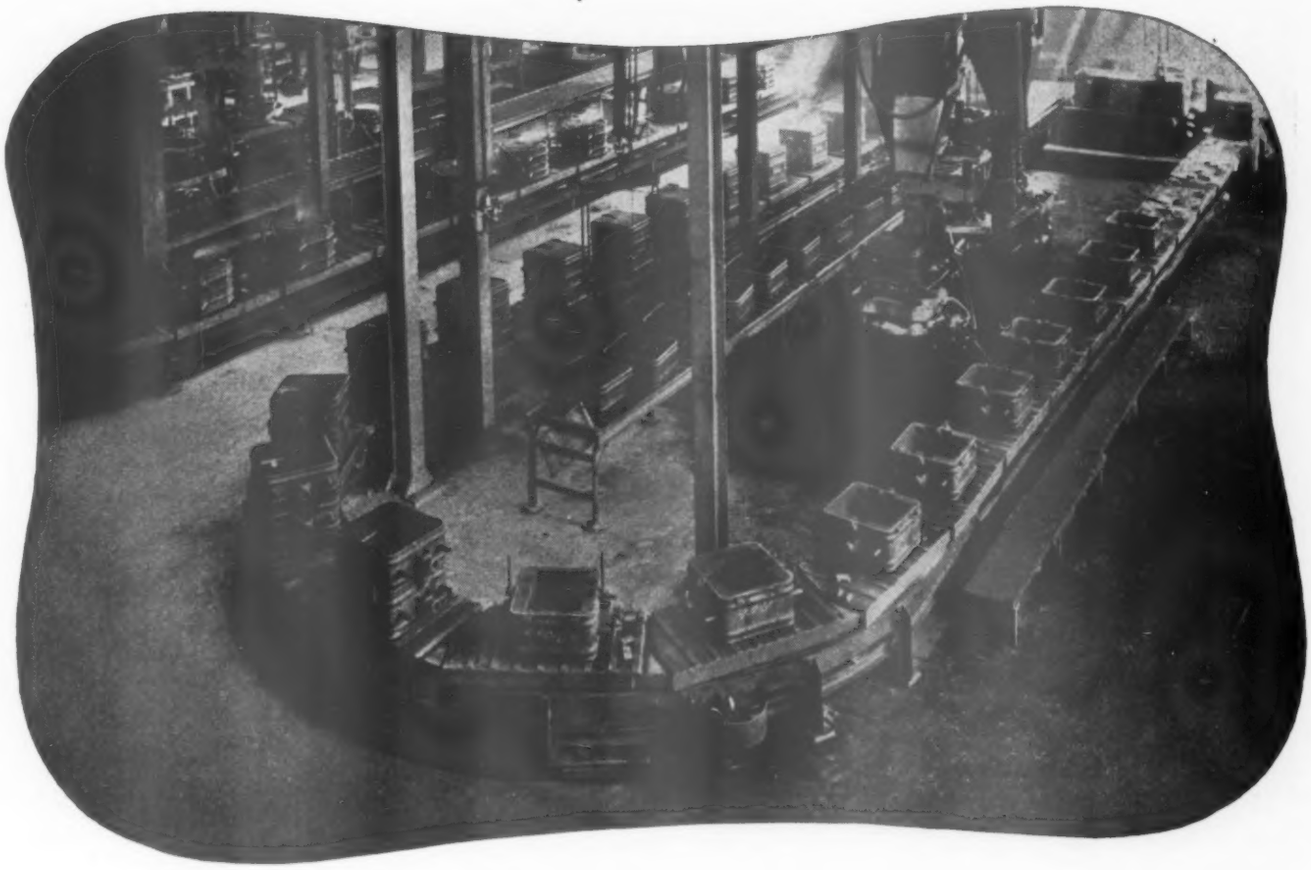
Compare Types of Risers

Concluding discussion of the morning dealt with a comparison, largely by means of slides, between risers on steel castings made in the conventional way and by means of Washburn cores. Most of the examples shown were ordnance castings produced several years ago, but the suggestion left by the author, W. E. Jones, American Steel Foundries, Bettendorf, Iowa, was that the advantages in terms of lower cleaning costs, easier removal of risers, less burning, etc., resulting from the use of Washburn cores might easily be translatable into economies in peacetime production of carbon steel castings.

A program of miscellaneous character occupied the concluding session sponsored by the Steel Division. J. W. Juppenlatz, Lebanon Steel Foundry, Lebanon, Pa., and J. B. Caine, Sawbrook Steel Castings Co., Cincinnati, presided as co-chairmen.

In a highly technical paper, "Low Temperature Properties of Certain

(*Continued on page* 150)



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Some of the foundry equipment and supplies displays which filled Cleveland Public Auditorium's exhibit area during Foundry Week

(*Continued from page* 148)

Steels," C. E. Sims and F. W. Boulger, Battelle Memorial Institute, Columbus, O., reported their findings on this important subject, regarding which information is somewhat meager. Room temperature characteristics of castings are not an accurate guide to low temperature performance of the same compositions. Discussion of the paper developed the point that testing of properties with the V-notch most likely is going to afford much valuable light on low temperature characteristics.

Basil Gray, English Steel Corp., Sheffield, England, author of the Institute of British Foundrymen Exchange paper, was present to read his contribution "The Production of Grand Slam Bomb Castings." This paper described the making of very large castings employing cores made by a unique method—one little used in the United States. A feature of these coses, which in production were turned out by two men in six hours, was their extremely smooth finish.

Present Two Russian Papers

N. B. Gelperin, chief engineer, State Institute, "Giprotjagmashe," Moscow, U. S. R. R., was author of a paper, "Susceptibility of Steel to Hot Tear Formation in Casting," was presented by title only, in absence of the author.

In his conclusions, the author suggests that one of the possible causes of hot tear formations in low-carbon steel castings may be the allotropic transformation of delta phase into gamma phase.

A second Russian paper scheduled but not presented was "Technological Principles of Casting Design," by Victor M. Shestopal, Stalin Machine Tool Institute, Moscow, U. S. R. R. The author was not present and the only draft of the paper available was in Russian, having been received too late for translation.

Presenting the report of the committee on nondestructive testing, C. W. Briggs, Steel Founders' Society of America, Cleveland, stated that the committee had little to submit concerning its activity in the past year. It has been looking into possibilities of use of the Sperry supersonic reflectoscope for inspecting internal soundness of castings. Its use probably is limited, however, since the instrument requires parallel surfaces. With the war ended and restriction being removed on reseach of the past few years, the committee expects to extend its activities in study of testing practice.

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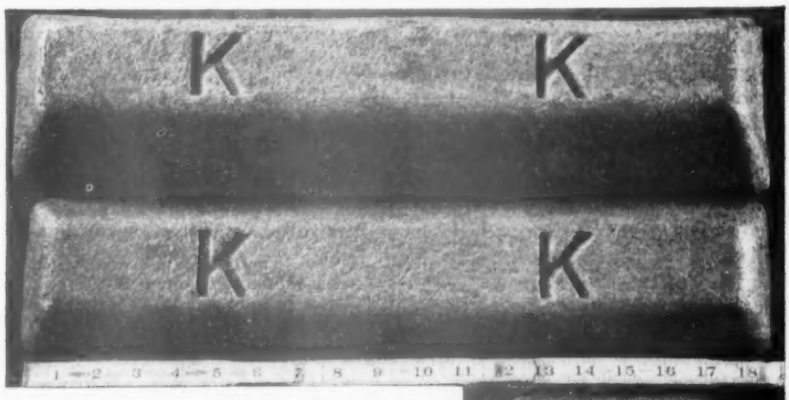

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ALUMINUM AND MAGNESIUM

Sessions Draw Large Crowds

INTENSE interest in developments relating to aluminum and magnesium castings was demonstrated by the large attendance marking all of the various sessions sponsored by the Aluminum and Magnesium Division. In some instances, meeting room facilities were inadequate to accommodate all who were present.

First session of the division was a roundtable luncheon held Monday noon at Hotel Cleveland, and was attended by over 150. R. E. Ward, Eclipse Pioneer Division, Bendix Aviation Corp., Bendix, N. J. and A. T. Ruppe, Bendix Products Corp., South Bend, Ind., presided. J. C. Fox, Doehler-Jarvis Corp., New York, presented an abstract of "Report of Committee on Recommended Practices for Aluminum and Magnesium Die Castings." A. Sugar, American Metal Co. Ltd., New York, followed with a resume of "Report of Committee on Recommended Practices for Aluminum and Magnesium Permanent Mold Castings." M. G. Corson, Acme Aluminum Alloys Inc., Dayton, O., discussed aluminum and magnesium alloys and then described a recently developed alloy containing about 11 per cent Mg, 0.3 per cent Be, remainder Al which he claimed possessed excellent physical properties.

Produce Sound Castings

Results of exhaustive investigation on the subject of producing sound aluminum and magnesium castings were presented in three papers at the second session, held Monday evening under the joint chairmanship of Leslie Brown, Magnesium Fabricators Division, Bohn Aluminum & Brass Corp., Adrian, Mich., and G. C. Glider, Ebaloy Foundries Inc., Rockford, Ill.

The first paper, dealing with the interrelation of various major factors determining the amount of microporosity in magnesium alloy castings, was prepared by L. W. Eastwood and J. A. Davis, Battelle Memorial Institute, Columbus, O., and was presented by the former. With the aid of numerous slides, charts and tables the speaker discussed the importance of controlled directional solidification. Main factors include pouring temperature, pouring rate, riser size and location, gating method, means for keeping the risers hot or open, and chills. Method of carrying on tests on these various factors was presented in considerable detail.

Conclusions from the work indicated that the chilling capacity of a mold material depends upon its thermal conductiviy and its heat capacity. The chilling capacity of a heterogeneous mold is particularly sensitive to the intergranular area of contact and to the thermal conductivity of the film separating the grains. Use of steel shot and core sand, or of zircon core sand, provides slightly greater chilling capacity than silica sand. High cooling rates contribute to high tensile properties and casting soundness, primarily through the promotion of adequate thermal gradients. Dissolved gas is detrimental to casting soundness where feed metal or feeding pressure is inadequate.

A paper prepared by F. P. Strieter and R. J. Maenner, Dow Chemical Co., Midland, Mich., and presented by Mr. Strieter, described the application of the centrifugal process to the production of magnesium castings. Basing opinion on a typical ring casting 13 in. diameter the experiments indicated that the centrifugal casting is superior to the statically cast ring in quality and is somewhat better than the static casting in economy of production.

Iron Mold Best

Effect of mold materials and practices on the quality of magnesium alloy castings was discussed in a paper presented by J. G. Metzoff, and prepared by him and M. V. Chamberlain, Dow Chemical Co., Midland, Mich. The character of the mold material is an important factor in the production of sound castings. The best results are obtained in a cast iron mold which exerts the greatest chilling effect.

The third aluminum and magnesium session, comprising presentation of three papers, was presided over by Walter Bonsack, National Smelting Co., Cleveland. "Heat Treatment of Aluminum Alloy Castings," prepared by Walter E. Sicha and H. J. Rowe, Aluminum Co. of America, Pittsburgh, was delivered by the former and consisted of a detailed review of the fundamentals involved in characteristic changes of the metal through heat treatment. Mr. Sicha traced the metal formation through the solidification range, and explained the effect of various types of subsequent heat treatment.

Treatments discussed included annealing at intermediate temperatures for stress relieving; solution treatment at high temperature; aging, or precipitation treatment; solution treatment followed by low temperature aging, and solution plus intermediate temperature treatment.

Results of tests conducted to determine the effect of certain elements on some properties of the 355 type aluminum alloy, were described in the second paper by R. A. Quadt, American Smelting & Refining Co., Barber, N. J. Test bars were cast of the alloy with varying additions of a number of different elements, including magnesium, nickel, zinc, manganese and iron. The bars were analyzed in the as-cast as well as the heat treated condition. In experiments with additions of iron and manganese it was found that deficiencies prevailing in properties of a high-iron content metal could be overcome by manganese additions.

The concluding paper on "Characteristics of Aluminum Casting Alloy 3 Per Cent Silicon—5 Per Cent Copper," by O. Tichy, National Smelting Co., Cleveland, described a general purpose alloy developed to make use of aircraft scrap. Aside from its broad adaptability, its use was recommended to eliminate segregation difficulties encountered by foundries where many different types of alloys are used. Tables were presented to show its various physical characteristics in the as-cast and heat treated conditions.

Concluding aluminum and magnesium session, with W. E. Martin, National Smelting Co., Cleveland, and A. W. Stolzenburg, Aluminum Co. of America, Detroit, as chairman and co-chairman, respectively, included three papers, two of which were committee reports.

L. W. Eastwood, Battelle Memorial Institute, Columbus, O., represented the Committee on Shrinkage and Porosity in presenting its report on "Unsoundness in Cast Light Alloys." This report dealt principally with shrinkage defects, and described the effect of gas evolution on shrinkage. Various slides were shown to illustrate this type of defect, showing how localized shrinkage grades off into microporosity.

Relieve Casting Stress

"Report of Committee on Dimensional Stability of Aluminum Castings," presented by Hiram Brown, Solar Precision Castings Co., Des Moines, Iowa, comprised study of a condition whereby permanent growth may occur in machined castings upon being subjected to heat, such as in paint baking. It was found that maximum growth occurs within a period of four hours at temperatures up to 450 F, and the recommended correction is an ageing treatment at that temperature so that fixed dimensions are attained before machining. Dimensional changes may result from not only this growth phenomenon but also from release of locked-up stresses, such stresses being caused usually by lack of progressive feeding of the casting, or unequal cooling after solution heat treatment. Stresses also may occur in quenching or in fabricating the casting. Stress relieving consists in heat treatment before machining at 450 to 700 F.

Effect of design and metallurgical factors on serviceability of magnesium castings was discussed by G. H. Found, Dow

(*Continued on page* 155)

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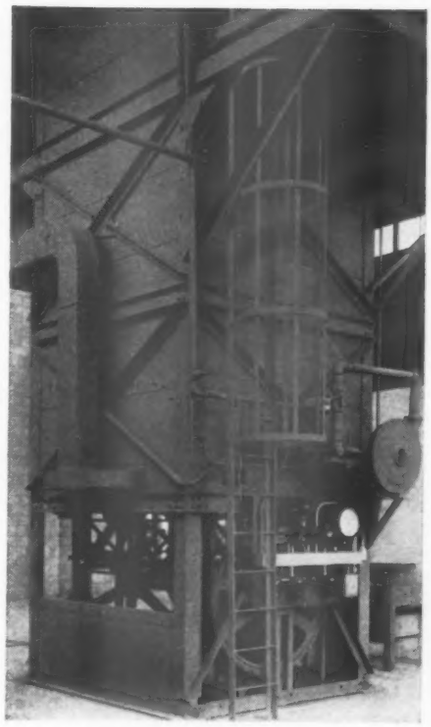

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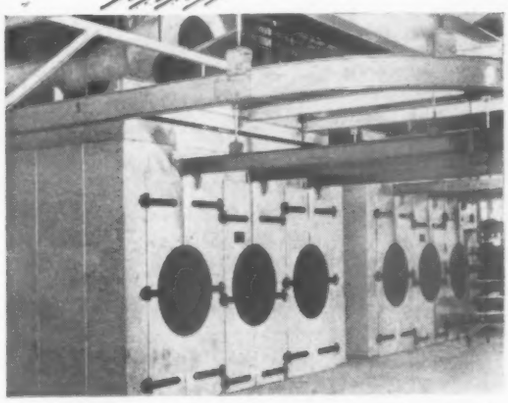

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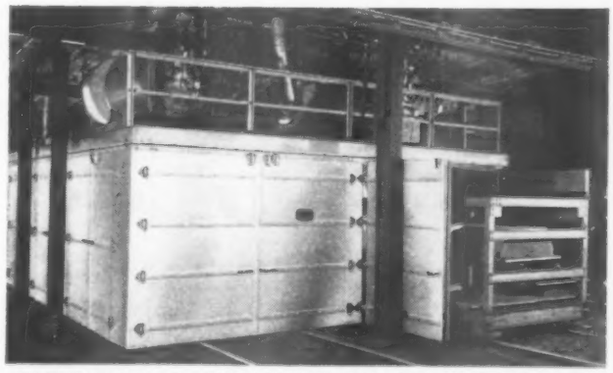

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(*Continued from page* 152)

Chemical Co., Bay City, Mich. An important factor in failure of castings, he stated, is that their design is based on the static properties of the metal rather than on its fatigue properties. Better understanding of fatigue properties by both the designer and the foundry is necessary, he pointed out. Describing results of tests, Mr. Found stated that fatigue failures usually originate at the casting surface. Porosity in the metal is not necessarily a factor in fatigue failure, as indicated by numerous examples of failures occurring in sound metal instead of in adjacent porous sections. In such instances, of course, the porosity did not extend to the surface.

BRASS, BRONZE MEETINGS

Consider Improved Practice

INSULATING pads and riser sleeves, knock-off risers and the sealing of bronze pressure castings through heat treatment were discussed in three papers presented before the Brass and Bronze Division's opening session, Thursday afternoon. G. K. Dreher, Ampco Metal Inc., Milwaukee, presided with A. K. Higgins, Allis-Chalmers Mfg. Co., this city, serving as co-chairman.

Howard F. Taylor, on leave from Naval Research laboratory, Washington, and W. C. Wick, formerly of that laboratory and now with Armour Research Foundation, Chicago, prepared the paper on insulating pads and riser sleeves, with Mr. Wick presenting it.

Insulating pads and riser sleeves make for sounder bronze castings, it was pointed out. This is the result of the metal in the riser remaining molten until long after the casting had solidified; further by the use of pads on thin sections the feeding range is increased. This report was presented in detail in the October and November, 1945, issues of THE FOUNDRY.

Knock-Off Risers Economical

In their paper on knock-off risers for nonferrous castings, Stanley W. Brinson and J. A. Duma, Norfolk Navy Yard, Portsmouth, Va., drew several interesting conclusions. Comparing the relative efficiency of knock-off risers in both ferrous and nonferrous divisions of the foundry, they stated that a greater number of sound castings, as well as easier knock-off, are obtained with the nonferrous risers. Perforated metal screens and graphitic carbon discs effect distinct economies in cleaning brass and bronze castings, and do not disadvantageously affect the feeding of risers.

Also it was declared perforated metal screens function best in brass risers not in excess of 5 in. in diameter. Graphitic carbon discs function with equal effectiveness in both brass and bronze risers, and in all sizes of risers. Highest economies are realized when the number of castings or when the risers themselves are large. It was also brought out that for the same amount of feeding, gypsum sleeves enable the use of risers approximately 30 per cent smaller than the conventional gravity feed type risers. Mr. Brinson presented the paper.

F. L. Riddell, Naval Research Laboratory, Washington, in discussing work in the sealing of nonferrous castings through heat treatment, said that the pressure tightness of leaky bushings of gun metal, valve bronze and hydraulic bronze was improved when annealed for three hours at 1200 to 1300 F in an air or oxygen-rich air atmosphere.

When bushings previously improved in pressure tightness by annealing in oxygen-rich atmosphere were re-annealed in hydrogen, he continued, the pressure tightness decreased by 25 to 50 per cent. Removing the outer layer of oxide scale after sealing in air did not cause appreciable loss in pressure tightness provided that the bushings were annealed for three hours at the necessary temperature.

Eliminate Gas From Castings

Gas elimination, combustion for crucible furnace melting and conditions of flow in bronze castings were discussed in three papers presented at the second brass and bronze session, with D. Frank O'Connor, American Saw Mill Machinery Co., Hackettstown, N. J., presiding, and Herman Smith, Federated Metals Division, American Smelting & Refining Co., Pittsburgh, serving as co-chairman.

Commenting on recent tests, George Dalbey, United States Navy Yard, Mare Island, Calif., said indications are that a large percentage of gas is eliminated in nonferrous alloy castings by holding the gas contaminated metal for a sufficient time above its melting point in an atmosphere relatively free of the contaminating gas. It is not necessary, he said, to have a drop in temperature during the time elapse to eliminate a large part of the gas.

The speaker remarked it is not unusual to pour a heavy casting and a light casting from the same ladle of metal and have the risers on the heavy casting mushroom and the risers on the light casting shrink. This, he said, not infrequently brings forth a dogmatic statement from furnace men that "the molds are too wet, rammed too hard, or the sand is too fine," only to result in a retort from the molders that "the metal is burned and full of gas."

A possible explanation, Mr. Dalbey pointed out, is that the small casting solidified fast enough to hold a large portion of the gas in solution so that no porosity resulted, whereas the heavy casting solidified slowly enough to allow the gas to migrate and concentrate in the last metal to solidify, with resulting porosity and mushrooming of the risers.

A. C. Schmid, Joseph Dixon Crucible Co., Jersey City, N. J., in discussing combustion, said that while it is a simple matter to make a fine gas analysis and a burner adjustment the stability of this adjustment is short lived in the average foundry, particularly where both air and fuel are variable.

A correct setting can be made during any particular melt, but when the metal is melted and ready for pouring the air and the fuel are turned off and when they are turned on again the new setting may be very much out of line.

Improved Burner in Prospect

He thought a practical solution would be the development, by the burner or furnace manufacturer, of a burner so designed that the melter could turn off both fuel and air without disturbing the ratio setting and be able to maintain the setting throughout the entire combustion range, from low flame to high flame. He said that considerable work has already been done along this line and that ratio controlled burners are beginning to appear on the market.

R. G. Hardy, Naval Research Laboratory, Washington, D. C., in presenting a paper prepared by him and Lt. J. T. Robertson, also of that laboratory, on conditions of flow, said that laminar flow produces in aluminum bronze the best mechanical properties, surface conditions and fracture. Laminar flow also is highly beneficial to manganese bronze, but conditions of flow have little influence on the mechanical properties, surface or fracture of gun metal.

He discussed various gating techniques, which he regarded as fundamentally sound, for both drossy metals (aluminum-bronze and manganese-bronze) and non-drossy metal (tin-bronze), stating with regard to the latter that direct pouring is permissible provided care is taken to avoid excessive splashing or cutting of the sand.

With regard to the drossy metals, he suggested the use of bottom gates wherever possible and also urged precaution

(*Continued on page* 158)

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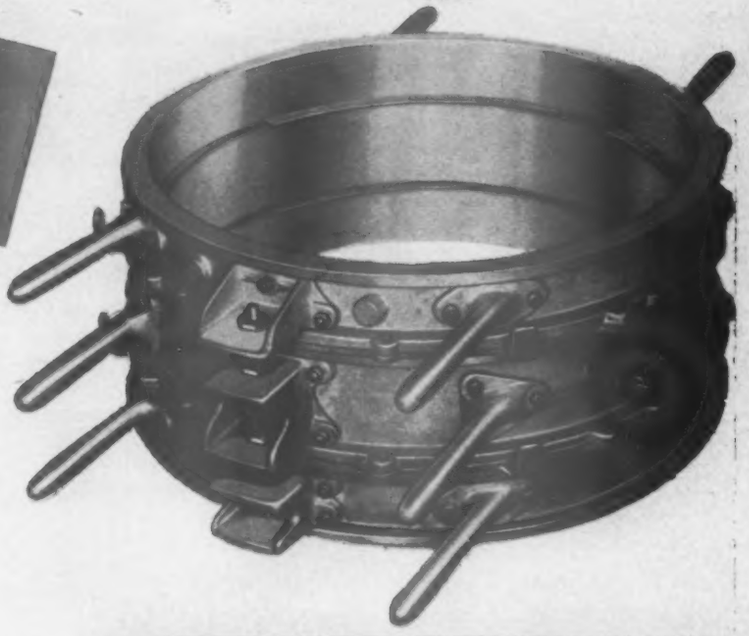

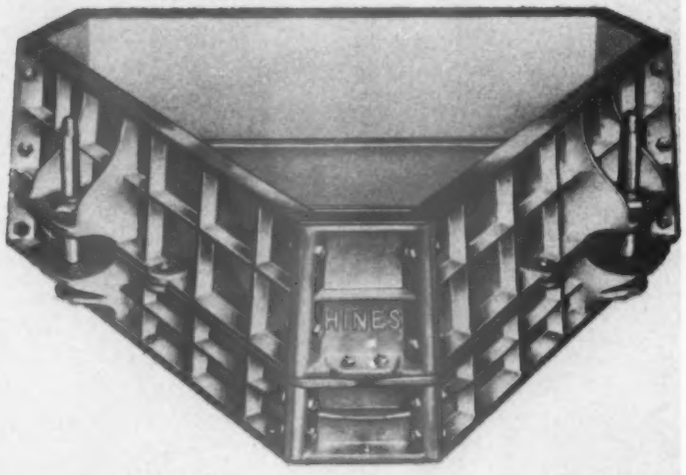

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(*Continued from page* 155)

in the use of horn gates so that the section size of the horn gate will not be large compared with the section size of the gated portion of the casting.

Gate thin sections, he said, by using thin tapered gates, which in his opinion impart all the advantages of horn gating without its harmful effect on feeding. Further admonitions were to keep the gating system full at all times and to use pouring basins where possible.

General recommendations were that various portions of the casting should be so arranged that they are connected with a rising channel of increasing cross section, and gates should be placed to promote directional solidification and should be easy to remove.

At the final session on brass and bronze under the chairmanship of G. P. Halliwell, H. Kramer & Co., Chicago, and A. H. Hesse, R. Lavin & Sons, Chicago, a paper on the mechanical properties of sand cast bronzes, prepared by R. H. Brouk, R. G. Hardy and B. M. Loring, Naval Research Laboratory, Washington, was presented by Mr. Brouk. The paper covered in considerable detail an investigation of variations in the mechanical properties of various bronze alloys as affected by chemical composition.

Study Test Blocks

The work was carried on with five different bronzes cast in heavy blocks and in separately cast coupons. The blocks were sectioned so that corresponding locations could be studied with respect to microstructure, grain size, specific gravity, chemical composition and mechanical properties. In a written discussion, G. M. Thrasher, R. Lavin & Sons, Elmira, N. Y., objected to the manner of taking the test samples. He claimed that the sample should represent the full cross section of the bar as nearly as possible. He cited a typical case where the sample taken as described in the paper was about to cause the rejection of good castings because copper analysis was below specification though the tensile and elongation were excellent and a cross section sample proved the analysis was satisfactory.

A committee report on manganese bronze, submitted by G. K. Dreher, Ampco Metal Inc., Milwaukee, went into detail on the proper method of preparing the metal, and the result of variations in the composition. The report covered

(*Continued on page* 161)

Additional views of the largest Foundry Show in AFA history. Number of exhibitors and visitors both established new records

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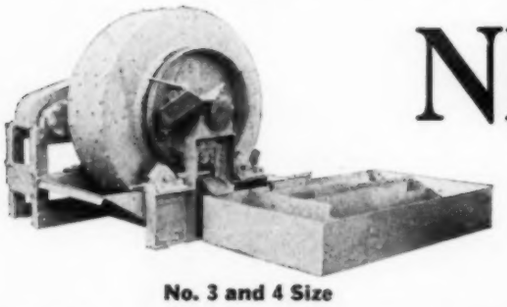

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Melting per Day ..... In Pounds

Cost of Metal ..... " "

Metal Loss, in Waste Material ..... Per Cent

Clean Reclaimed Metal-Value ..... As Scrap ..... c per Lb.
Remelt ..... c per Lb.

Electric Current Conditions ..... AC. D.C. V.C. Ph.

Power Cost ..... Per K.W. H.P.

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YONKERS 2, NEW YORK

(*Continued from page* 158)

the usual three classifications of manganese bronze A, B, and C.

An exchange paper from the Institute of Australian Foundrymen, prepared by H. E. Arblaster and dealing in intimate detail with the subject of manganese bronze, was presented in slightly abstracted form by Mr. Halliwell. With a few minor variations the foundry practice and resulting metal were similar to those in American foundries.

REFRACTORIES SESSIONS

Cover Variety of Subjects

WITH C. E. Bales, Ironton Fire Brick Co., Ironton, O., presiding, and assisted by C. S. Reed, Chicago Retort & Fire Brick Co., Chicago, various types of refractories and their applications were covered in four papers delivered at the first of two meetings, sponsored by the Refractories Committee.

R. P. Stevens, Chicago Retort & Fire Brick Co., Chicago, urged refractory suppliers to work in closer co-operation with foundrymen, to the end that cupola blocks applicable to actual melting practice requirements may be supplied. Present day reading of lining brick tables are not indicative of sizes actually carried in stock and are widely divergent from recommendations drafted by producers and users of cupola refractories and the Department of Commerce, from 1932 to 1938. The speaker stated that if producers and users of refractory materials will get together on this and other problems, they will be better off.

Suggest Change in Specification

C. A. Brashares, Harbison-Walker Refractories Co., Pittsburgh, in a paper covering properties and application of foundry refractories stated that fire clay refractories represent the type of material in most common use. Materials containing many chemicals cannot reach a standard melting point. To explain the use of pyrometric test cones, Mr. Brashares showed slides illustrating method of mounting them and their appearance after testing for determining refractoriness. While on this subject he recommended that specifications should read "Pyrometric cone equivalent to temperature needed," instead of to a standard 3131 F. Methods of determining strength of refractories principally deal with cold crushing strength, modulus of rupture, and abrasion resistance, he stated. Other phases covered included volume stability at high temperatures, strength under load at high temperatures, and spalling resistance.

In a discussion of refractories in nonferrous practice, H. R. Kohl, Algonac Foundry Co., Algonac, Mich., outlined some practical experiences with linings in crucible melting furnaces wherein mullite, synthetic, and silicon-carbide type refractories were used, the latter proving slightly more expensive but producing relatively more heats. He stressed the fact that low first cost may result in higher over-all cost and emphasized that little difficulty had been found due to growing or shrinkage, in the use of the linings mentioned. Mr. Kohl said the most effective way of checking costs is to choose a material and then keep comparative records.

R. H. Zoller, Zoller Castings Co., Bettsville, O., discussed use of rammed refractories in electric steel foundries. Rammed linings cannot be used to replace brick arches or suspended sections where the refractory must support its own weight, although some research has been made to develop a refractory mixture for ramming furnace roofs. Mr. Zoller described mixture coarseness, drying periods, mixing ingredients and the use of coke for drying. Standardization of refractory mixtures and maintenance of routine practices are essential in making good refractory mixtures, he stated.

Program of the concluding session on refractories consisted principally of a question-and-answer period, popularity of which was indicated by the fact the

(*Continued on page* 164)

THE WHITE HOUSE
WASHINGTON

May 2, 1946

Dear Mr. Walls:

I wish you would pass on to the members of the American Foundrymen's Association my heartiest congratulations on the occasion of your golden jubilee congress. The members of the castings industry have good reason to be proud of their contributions to the winning of the war but I am sure that you are thinking less about what you did during the war than about what you can contribute to the growth and prosperity of American industry during the period that lies ahead of us.

The United States needs your energetic cooperation in the achievement of full production and full employment. Nothing less than this vigorous cooperation with all other groups in the country will achieve the kind of future that this country must have to carry out its obligations to its own people and to the world.

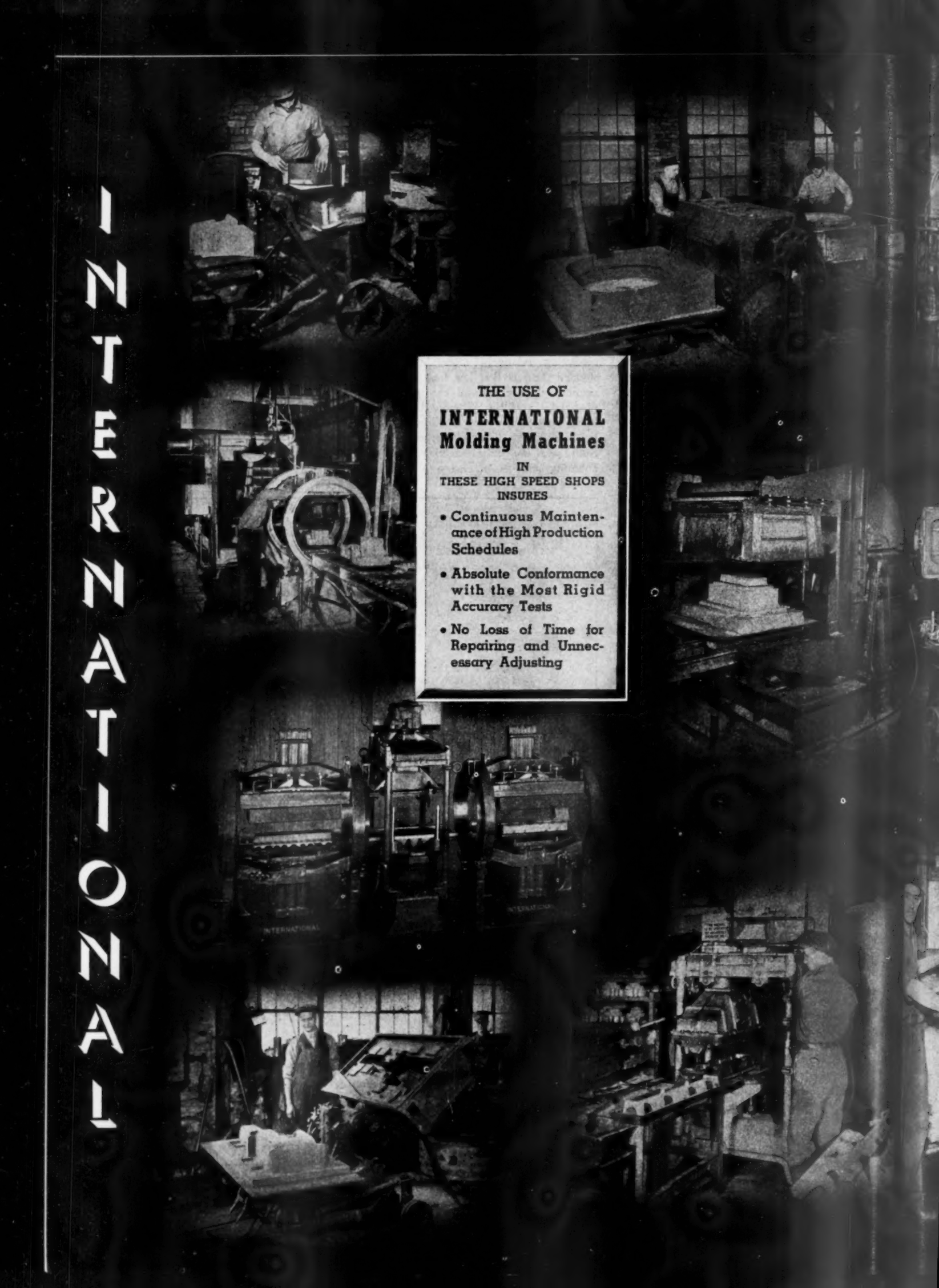
Accept my sincere best wishes for a highly successful conference and for prosperous years ahead.

Very sincerely yours,

Harry Truman

Mr. F. J. Walls,
President,
American Foundrymen's Association,
Statler Hotel
Cleveland, Ohio

Message received during the convention from President Truman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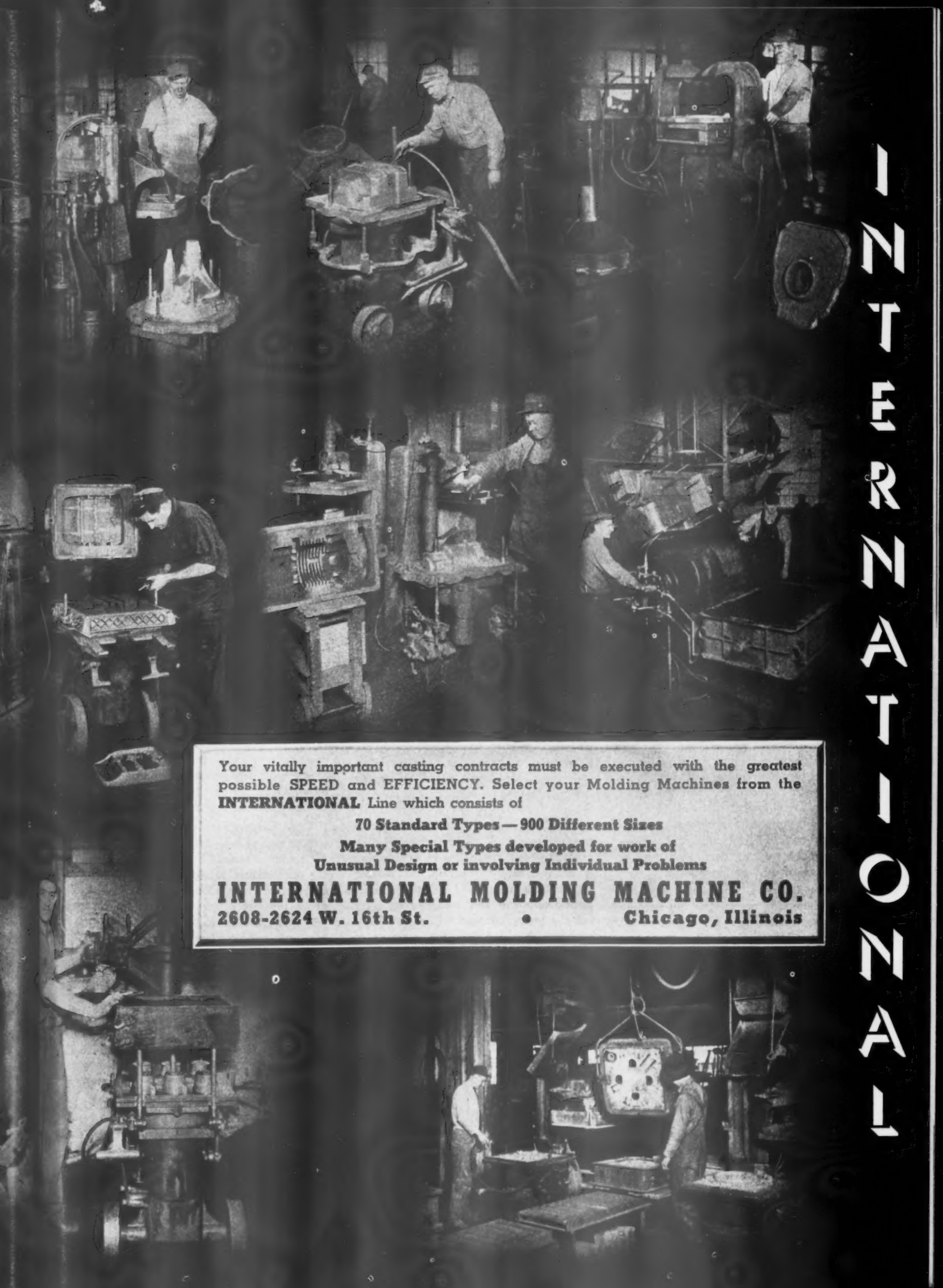

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(*Continued from page* 161)

meeting extended well beyond the usual closing time. C. E. Bales again presided, assisted by C. S. Reed. In addition to the quiz program a paper on "The Lining and Patching of Cupolas" was presented by E. J. Lally Jr., Forest City Foundries Co., Cleveland. This broad subject was well handled in a concise presentation in which the speaker recommended making the lining as near a perfect circle as possible in order to minimize effects of expansion and contraction. Joints of the brick should be staggered in the cupola well, and tuyeres should be bolted to the shell if possible. A tight fit is an important consideration. The patching compound should be mixed 18 to 24 hours before it is used and, if possible, the patch should be dried at least 4 hours before the cupola is operated.

Mr. Reed served as a capable modator for the "Information Please" program, with the following serving as panel leaders and supplying the answers: Richard H. Stone, Vesuvius Crucible Co., Swissvale, Pa.; J. A Bowers, American Cast Iron Pipe Co., Birmingham; E. J. Carmody, Chas. C. Kawin Co., Chicago, and A. S. Klopf, Lester B. Knight & Associates Inc., Chicago.

The Refractories Committee previously had solicited questions for submission to the panel. A few of the numerous queries and answers follow: What is the linear thermal expansion of fireclay and silica brick? Fire clay $\frac{1}{16}$-in. per foot at 2400 F; silica $\frac{3}{32}$-in. per foot at 1400 to 2800 F. Why does cupola lining spall under temperature changes? Spalling should be slight unless the lining is cooled sharply by water preparatory to patching. Which is the better cupola block, dense or porous type? Dense is better for long operations. For small heats with frequent temperature changes a less dense type is preferred.

Is a water-cooled melting zone practical? Yes, for long operations. One opinion expressed was that even on short runs a 50 per cent saving could be effected in lining life. What is the best mixture for cupola patching? How the compound is placed is the more important consideration, but a suitable material is silica sand and fire clay mixed in proportions of 50-50, 65-35 or 85-15. Amount of clay used determines its plasticity. Water content should be kept as low as possible. How can a crucible be prevented from sticking to the furnace stool? Place a piece of cardboard on the stool; when it chars a parting is provided. Or a layer of sand or graphite may be used.

EQUIPMENT AND SAFETY

Combined in Joint Discussions

TWO joint meetings were held during the convention by the Safety and Hygiene Committee and the Plant and Plant Equipment Committee. The type of equipment discussed at both sessions related principally to improving foundry working conditions through correction of dust problems.

James Thomson, Continental Foundry & Machine Co., presided at the opening meeting, with C. P. Guion, W. W. Sly Mfg. Co., Chicago, acting as technical chairman. "Accident Prevention as a Function of Management," the first paper, was presented by R. R. Meigs, Liberty Mutual Insurance Co., Boston, and comprised a review of basic thinking regarding the role of management in promoting safety in the foundry. The speaker pointed out that accident prevention can play an important part in the overall job of making the foundry a better and more attractive place in which to work and that it should be recognized by management as an integral part of foundry operations—something that is given equal consideration with production problems in planning and execution. In the latter connection, Mr. Meigs stated that many safety hazards actually are production hazards before they become responsible for an accident that results in their correction.

Management's role lies in establishing a definite safety program, in making specific assignments and delegating sufficient manpower and authority to carry out the policy adopted. Likewise, management should follow the progress of safety work, assisting in seeking correction of a poor record and recognizing a good record. Another task is to place workers in jobs to which they are physically adapted. Complete mechanization is not necessary to eliminate much of the hard manual effort in the foundry, Mr. Meigs declared. A hard surface floor and a lift truck, or a short monorail section or a roller conveyor frequently may suffice to obviate much heavy lifting and correct a safety problem.

A comprehensive review of mechanical shakeout systems for the correction of dust problems was presented by James L. Yates, Worthington Pump & Machinery Corp., Buffalo. Five major points should be considered in designing a shakeout installation. These are: 1. Size of shakeout required. 2. Foundation. 3. Dust control apparatus. 4. Sand handling from the shakeout. 5. Conveyor for handling molds, flasks and castings. Mr. Yates favors a shakeout grate with small openings which will trap gaggers and other foreign material, rather than rely upon their separation after they and the sand have dropped through the deck. He recommended care in installing the foundation, stating that its location should be considered in relation to building column supports and underground sewers and water lines. Large units also should not be permitted to transmit vibrations to delicate laboratory instruments.

After discussing the various types of shakeout dust control equipment, including overhead canopy, side hood and downdraft exhaust units, Mr. Yates gave a detailed description of the totally enclosed shakeout installation recently installed by the Worthington company at Buffalo. An article by Mr. Yates on this subject was presented in THE FOUNDRY for February.

Explain Dust Collecting Systems

A comprehensive review of the equipment available for dust exhaustion, collection and disposal was presented by six speakers at the second session of the groups. Mr. Thomson also presided at this meeting, with W. O. Vedder, Pangborn Corp., Hagerstown, Md., handling the introduction of speakers. Mr. Vedder explained that the purpose of the program was to treat each of the elements of the complete exhaust system, in addition to discussing the means of maintaining the efficiency of these elements.

E. A. Carsey, Kirk & Blum Mfg. Co., Cincinnati, described the different types of commonly-used hoods, emphasizing the importance of correct design and the fact that the exhaust volume determines the size of pipe required to convey exhausted air to the collector. Piping requirements for various types of hoods and exhausters were discussed and illustrated by numerous slides. Dust collectors next were considered, this subject being presented by three speakers. H. C. Dohrmann, Buell Engineering Co., New York, discussed the features of centrifugal collectors; G. A. Boesger, W. W. Sly Mfg. Co., Cleveland, described the cloth type collectors, while A. S. Lundy, Claude B. Schneible Co., Detroit, explained the principles of wet collectors.

Fans and exhausters, the other necessary component of the dust control system, were described by Phillip Cohen,

(*Continued on page* 167)

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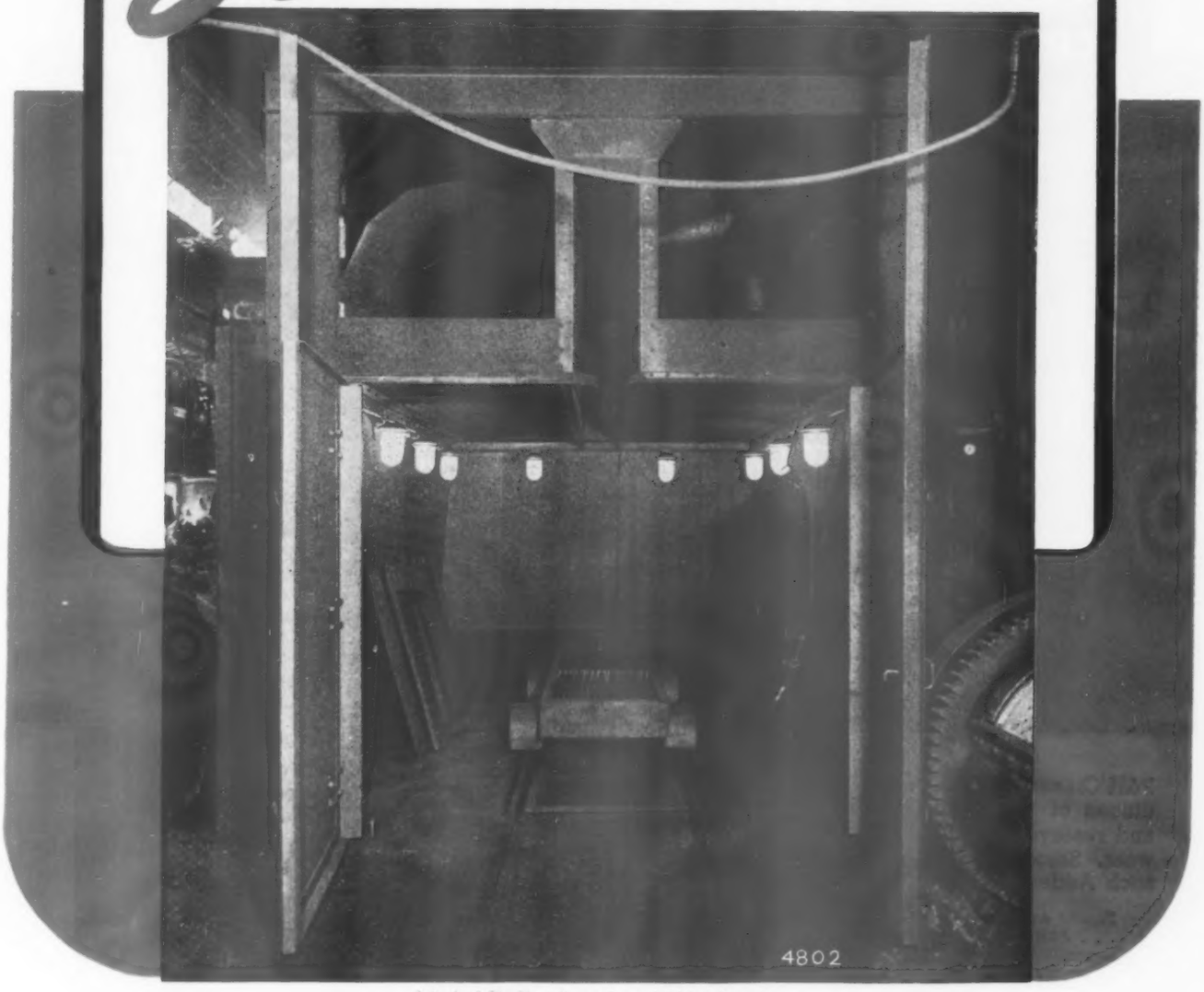

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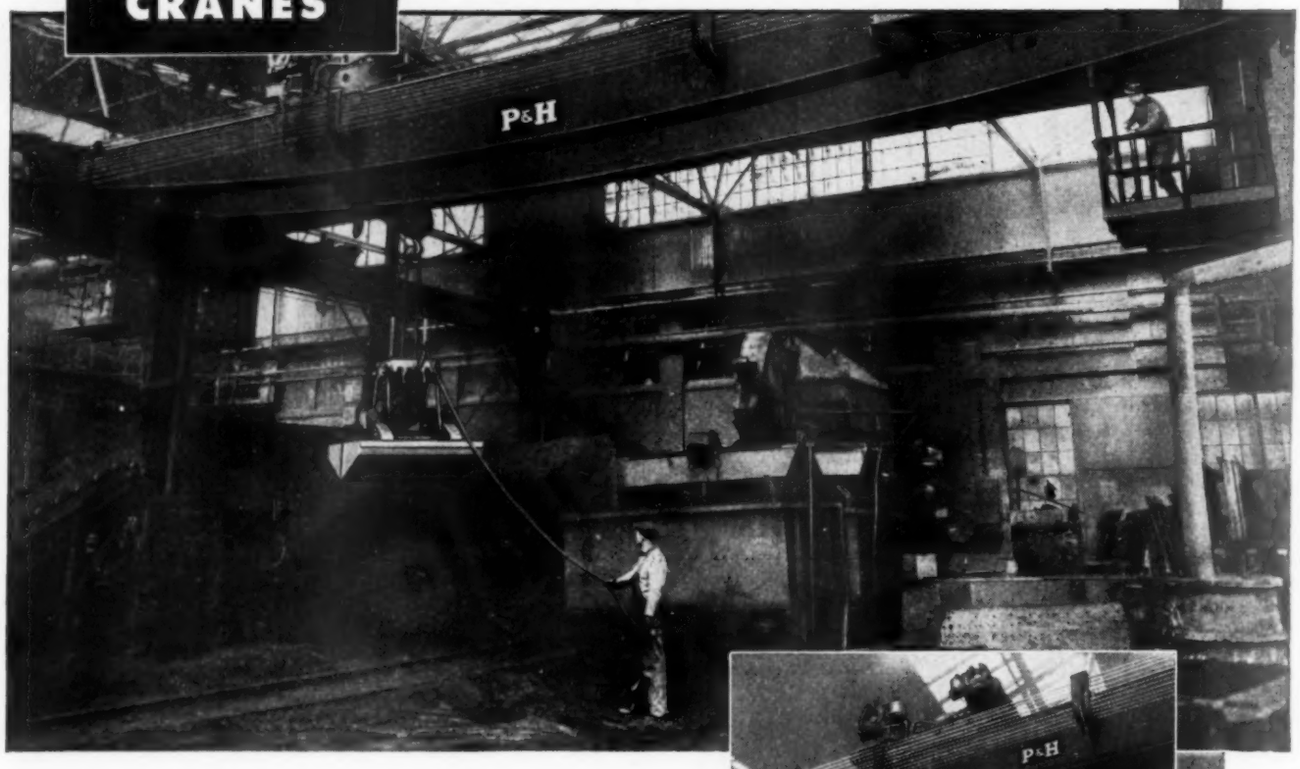

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(*Continued from page* 164)

Cleveland district manager for the B. F. Sturtevant Division, Westinghouse Electric Corp. He discussed the various types of fans and their applications, pointing out that their capacities depend on the nature and magnitude of restrictions placed at the inlet or outlet end of the exhaust system. Also, connections cannot be added indiscriminately to a system without impairing its efficiency. He recommended thinking in terms of the entire system, not the individual equipment, when installing or altering exhaust units. Equal consideration likewise should be given to the replacement of the air volume removed from the plant by exhausters.

How to keep dust control equipment in operation was explained in the concluding paper on "Maintenance," presented by K. M. Smith, Caterpillar Tractor Co., Peoria, Ill. Mr. Smith stated that no equipment is better than the care given it but that because dust control units are not production units their care frequently is neglected. He pointed out, however, that if breakdowns in exhausters and collectors can be prevented, production can be maintained and money actually saved thereby. Mr. Smith showed various slides to illustrate the result of inattention to inspection and maintenance of equipment. Among some of his recommendations were the use of a steam jet through ducts carrying condensible materials; the bolting together of horizontal ducts so that they can be easily disconnected and turned occasionally, in order to spread the wear; and delegation of responsibility for maintenance work to the proper individual.

SAND RESEARCH SESSIONS

Featured by Exchange Paper

FEATURING an exchange paper of the Czechoslovak Foundrymen's Association, the first of two technical session on sand research drew a crowd of nearly 150. Chairman was Howard F. Taylor, Massachusetts Institute of Technology, Cambridge, Mass., and J. A. Rassenfoss, American Steel Foundries, Indiana Harbor, Ind., assisted as co-chairman.

First on the program was the sixth annual report of the committee on physical properties of foundry sands at elevated temperatures, presented by D. C. Williams, AFA research fellow, Cornell University, Ithaca, N. Y. With the aid of slides he described a special furnace built in his laboratory for testing hot compressive strength of sand specimens. It is a cylindrical unit heated by nine vertical electric heating elements, with the sand specimen mounted on the central axis and observable through a port. Wall of the furnace comprises three separate layers of insulating material. The setup is unusual in that capacitors are used for the control of temperature. Study of strength data presented shows values considerably lower than those obtained with the dilatometer, particularly at the longer time intervals.

Some extra safety equipment is now in process of being added to the installation; meanwhile Dr. Williams' laboratory is doing some work on rammed test specimens at temperatures over 1200 F, revealing a breakdown or "separation" of the specimens into three parts—a top section, a bottom section and an outer shell or "rind." The phenomenon is believed by Dr. Williams to be due to what he describes as pressure isobars.

Harry W. Dietert, Harry W. Dietert Co., Detroit, briefed a paper which he and one of his associates, Robert L. Doelman, had prepared in an effort to throw further light on the heat absorption properties of various molding and core sands. His test specimen was prepared by placing the hot junction of a thermocouple in the center of a rammed sand cylinder, then heating it to various temperatures, both with and without a covering hood to retain evolving gases, and observing the recordings of the thermocouple as the time interval increased. His studies indicated that the density of the sand—that is, weight per cubic foot—was the principal factor in determining heat absorption or heat subtraction, with high density, high hardness and heavy ramming making for high heat subtraction.

Elbert Troy, Dodge Steel Co., Philadelphia, took exception to some of Mr. Dietert's conclusions and test methods, but the argument resolved mainly into the proper interpretation and terminology, rather than any basic disagreement.

Mr. Dietert consented to abstract the Czechoslovakian exchange paper, which was written by Vojetch Volenik of that country, who was not present. His discussion centered on a method for measurement and investigation of gases escaping from oil cores by placing a 1⅛ x 4-in. cylindrical specimen of the sand in a steel tube, pouring molten aluminum around it and capturing the escaping gases in bottles, then measuring their volume and composition. Offering a considerable amount of supporting data, the foreign foundry expert concluded that gas quantities developed from different oils are in a close range, although much higher gas volumes were observed as set free from alkylated cellulose. He suggested the gas development from cores of various chemical compositions cannot be estimated with reasonable accuracy from their loss of weight on ignition.

A second foundry engineer from Czechoslovakia, L. Jenecek of Prague, personally presented a paper providing basic information on the actions of various types of binders in molding sands. He examined in detail the effects of different types of mixing agents, the importance of the order of their mixing, type of mixing equipment used, etc. His contribution drew much applause, and Dr. Williams commented that the fundamental data presented should prove extremely valuable to foundrymen as a means of obtaining more economical use of binders, particularly in the present period of shortages.

Care in Preparing Tests

At the concluding sand reseach session, under the joint chairmanship of D. C. Williams, AFA Research Fellow, Cornell University, Ithaca, N. Y.; and R. E. Morey, Naval Research Laboratory, Washington, a great deal of attention was paid to the equipment and methods empoyed in performing the various tests. Commenting on one of these devices later a member claimed that by attaching three brass strips to the lower part of a certain device, about twice the usual amount of clay may be recovered. With the aid of numerous charts and slides, D. C. Williams demonstrated how the clay and fineness determinations can be quantitative and therefore more readily understood and applied in practice.

A second paper, prepared by A. I. Krynitsky and Margaret Price, Bureau of Standards, Washington, and presented by R. E. Morey, gave a detailed account of the fineness tests of molding sands as carried on at the Bureau of Standards. Through a combination of circumstances neither of the authors was present.

A spirited discussion followed the presentation of a paper on the prevention of veining and penetration on castings made in synthetically bonded sands. The paper was prepared by R. E. Morey and J. R. Kattus, Naval Research Laboratory, and was presented by Mr. Morey. In his introduction the speaker referred to the reasons leading up to the development and adoption of a sand suitable for use on the repair ships of the navy, forced during the late war to operate far from the home base. Experiments resulted in the adoption of a synthetic sand in which molds are made for gray iron, steel and nonferrous castings. This

is a silica sand AFA fineness 80-90, bonded with 2.5 per cent bentonite, 2 per cent cereal and moisture between 2 and 3 per cent. While this sand air dries more rapidly than natural sand, this factor is an advantage since the metal lies against it quietly and the castings have a nice clean skin.

In a fourth paper, not listed on the program, Harry Dietert, described methods and equipment employed in a series of tests designed to obtain information concerning the elevated temperature properties of mold surfaces, including spalling, confined expansion, hot strength, and hot deformation, where a wide variety of materials was mixed with the facing sand.

INSPECTION OF CASTINGS

Discussed at Two Sessions

UNDER sponsorship of the Castings Inspection Committee, the initial meeting on inspection techniques and procedures convened Tuesday morning, with Harold W. Warner, Allis-Chalmers Mfg. Co., Milwaukee, presiding, and E. G. Leverenz, American Steel Foundries, East Chicago, Ind., acting as co-chairman. Three papers were presented, covering general aspects of the duties and functions of the inspection department as seen by management, inspection as the backbone of quality control, and nondestructive inspection of castings. They were interesting and instructive presentations, but brought out little that was new in the field, and evoked comparatively little discussion.

M. D. Johnson, Purolator Products Inc., Newark, N. J., presented the management viewpoint of inspection department procedures, emphasizing the importance of efficient inspectors and a thorough-going program as a vital element in production costs and improved relations with castings buyers.

Honest control methods and sound inspection techniques were stressed by W. H. Gunselman, Samuel Greenfield Co., Buffalo, because of their particular importance as a part of modern quality control in the foundry. He gave consideration to the relative merits and applicability of the different methods—radiographic, magnetic, hydrostatic, sonic, etc.

Reviews Test Methods

A complete review of the various nondestructive test methods was contained in the paper presented by Clyde L. Frear, Bureau of Ships, Navy Department, Washington, and prepared in collaboration with R. E. Lyons of the same organization. Their discussion had been published in full in advance of the meeting, hence was merely abstracted. The text gave brief descriptions of the following types of nondestructive tests: Visual, sound or percussion, impact, pressure, radiographic, magnetic, electrical conductivity, penetrants, and supersonics.

Pointing out that the value of any test depends upon the ability of the inspector, the authors gave as their opinion the fact that no person can be a successful inspector until he has had a thorough training in manufacturing processes as well as in the technique and inspection methods and interpretation of tests. Mr. Frear predicted that eventually every foundry will have complete radiographic equipment for testing, and will come to regard it as an asset instead of a liability as many now do.

Present Buyers' Viewpoint

At the second meeting on inspection of castings the session differed somewhat from the usual type in that it was devoted to a panel discussion of "Suppliers' and Buyers' Viewpoints of Inspection in the Foundry." E. F. Platt, Sperry Gyroscope Co., Brooklyn, N. Y., was chairman with W. H. Gunselman, Samuel Greenfield Co., as co-chairman. Panel discussion leaders included O. B. Sandberg, Chicago & North Western Railroad Co., Chicago, who spoke on the purchasers' viewpoint; Walter Klayer, Aluminum Industries Inc., Cincinnati, who presented the suppliers' and buyers' viewpoint; F. L. Bender, Chicago Hardware Foundry Co., North Chicago, Ill., who discussed the inspectors' viewpoint; Nelson Stuit, Grede Foundries Inc., Milwaukee, who talked on the sales department viewpoint, and T. D. Piper, Northrup Aircraft Inc., Hawthorne, Calif., dealt briefly with aircraft castings.

Mr. Sandberg said he thought that often the demand for production had a tendency to slight quality in castings, and also to ship castings which had not received proper inspection. Consequently, the customer has to return more castings than if the inspection had been performed properly in the foundry. Mr. Klayer stated that the buyer of castings should supply all pertinent data relative to the alloy desired, the physical properties, heat treatment if any, the methods of inspection, etc. With such information available the foundry can supply the kind of castings desired since the object is to maintain a satisfied customer.

Mr. Bender pointed out that castings should be divided into two classes, namely critical and noncritical. Critical castings are those which have to meet definite specifications on quality, dimensions, finish, etc. On this type close inspection is maintained, and follows the requirements stipulated by the purchaser. Mr. Stuit said he believed the sales department could help considerably by checking with the purchaser to determine his opinion on the castings supplied, and relaying such information back to the foundry so that changes could be made. Mr. Piper reported that considerable difficulty had been found in obtaining castings suitable for aircraft requirements, and that he would like to see some work done on the determination of the effect of various types of irregularities in castings on service life.

Editor's Note: Concluding reports on other technical sessions of the AFA Congress will be presented in the July issue.

Book Review

ASTM Standards 1945 *Supplement, Part I Metals*, cloth, 395 pages, 6 x 9 inches, published by the American Society for Testing Materials, Philadelphia. Price $4.

In the intervening year between the biennial appearance of the *Book of ASTM Standards* the American Society for Testing Materials publishes a supplement for each part which brings it up to date by including new standards and tentatives or revisions. The present supplement on metals contains over 85 standards and tentatives on ferrous and nonferrous materials. Of these 28 are standards, 10 newly adopted and 18 are replacements of existing standards. Of the 59 tentatives, 15 are new and 44 are replacements.

Specifications of interest to the foundry field include two on steel castings; end-quench test for hardenability of steel; total immersion corrosion test of stainless steel; foundry pig iron; magnesium-base alloy ingot for sand castings, die castings and permanent mold castings; magnesium-base alloy sand castings; magnesium-base alloy permanent mold castings; copper-base alloys in ingot form for sand castings; cast copper-base alloys; bronze castings for turntables and movable bridges; high-leaded tin bronze sand castings; leaded red brass and leaded semi-red brass sand castings; leaded yellow brass sand castings for general purposes; aluminum bronze sand castings; silicon bronze and silicon brass sand castings; chromium-nickel-iron alloy castings (25-12 class) for high temperature service, and industrial radiographic terminology for use in radiographic inspection of castings and weldments.

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NEW OFFICERS, DIRECTORS

Elected by AFA

SHELDON V. WOOD, president and general manager, Minneapolis Electric Steel Castings Co., Minneapolis, was elected president of the American Foundrymen's Association for 1946-47, and Max Kuniansky, vice president and general manager, Lynchburg Foundry Co., Lynchburg, Va., was selected as vice president, at the annual business meeting held during the recent Cleveland convention.

Directors to serve three-year terms include: Horace A. Deane, vice president in charge of operations, Brake Shoe & Castings Division, American Brake Shoe Co., New York; Stowell C. Wasson, manager, National Malleable & Steel Castings Co., Chicago; Bruce L. Simpson, president, National Engineering Co., Chicago; J. E. Kolb, pattern shop superintendent, Caterpillar Tractor Co., Peoria, Ill.; and Harry G. Lamker, superintendent of foundries, Wright Aeronautical Corp., Paterson, N. J.

Fred J. Walls, International Nickel Co., Detroit, was elected a director to serve one year. New officers and directors will take office at the annual meeting of the board in July.

Sheldon V. Wood

SHELDON V. WOOD, president and general manager, Minneapolis Electric Steel Castings Co., Minneapolis, has been prominent in the work of the Steel Division Advisory committee of the association. He has served as vice president and member of the executive committee for the current year and was a director for three years, 1942-1945. He was active in the work of the Twin City Foundrymen's Association and assisted in the formation of its successor, the Twin City Chapter of the AFA, of which he was a director. Mr. Wood was born in Jefferson, Iowa, and was graduated from the University of Minnesota in 1904 with an engineering degree. He started his business career as mining engineer with Butler Bros., Hibbing, Minn. From 1905 to 1907 he was engaged in engineering work with the Great Northern Railway, St. Paul, and was sales engineer with Olds Gas Engine Co., Lansing, Mich., from 1907 to 1912. Mr. Wood joined Minneapolis Electric Steel in 1913, as manager, later becoming president.

Max Kuniansky

MAX KUNIANSKY, vice president and general manager, Lynchburg Foundry Co., Lynchburg, Va., is well known for his outstanding contributions to developments in the gray iron industry. An active member of the AFA, he has served on the Gray Iron Castings, Pig Iron Qualities, Recommended Practices for Cupola Mixtures and Cupola Research Committees, and has been a national director since 1943. His various contributions to the association and to the industry were recognized in 1941 when he was awarded the William H. McFadden Gold Medal of the AFA. Mr. Kuniansky was born in Russia and came to this country in 1907. He was graduated from the Georgia School of Technology in 1919 with a degree in engineering chemistry. From 1917 to 1923 he was connected for varying periods with the former Aetna Explosives Co., now the Hercules Powder Co., at the Birmingham and Ishpeming, Mich., plants. Later he was associated with the Chicago plant of National Malleable & Steel Castings Co., and with the American Cast Iron Pipe Co., Birmingham. In 1923 he entered the employ of the Lynchburg Foundry Co. as chief chemist and was appointed works manager in 1928, with headquarters at Radford, Va. Later he became general manager, stationed at Lynchburg, and subsequently vice president in addition to his duties in that position. A member of the Chesapeake Chapter of the AFA, he has served as one of its directors, and on many occasions has presented addresses before chapters of the association and annual convention sessions.

Horace A. Deane

HORACE A. DEANE, vice president in charge of operations, Brake Shoe & Castings Division, American Brake Shoe Co., New York, has been active in national committee work and has presented a number of papers before national conventions of the association. He is chairman of the Metropolitan Chapter of the AFA and a past chairman of the Quad-City Chapter. Mr. Deane, a graduate of the University of Illinois, was associated with Deere & Co., Moline, Ill., from 1920 to 1939, as a chemist on iron, steel, nonferrous and miscellaneous materials, and later as general metallurgist in the heat treatment of steel. While there he devoted a great deal of time to foundry problems including metallurgical processes, general methods and costs. He joined the Brake Shoe & Castings Division, American Brake Shoe Co., in 1939, as assistant works manager, became works manager in 1943, and this year vice president in charge of 18 of the company's plants.

Stowell C. Wasson

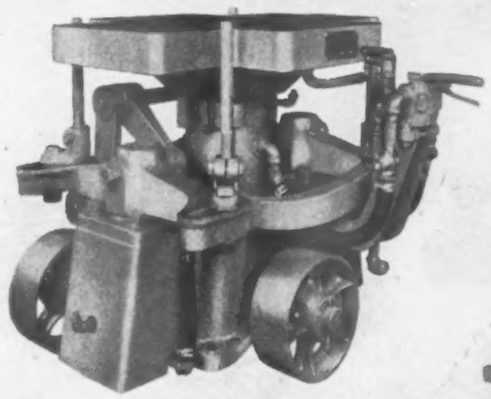
STOWELL C. WASSON, manager, National Malleable & Steel Castings Co., Chicago, has spent his entire business career with that company, which he joined in 1910. Becoming associated with the sales department of the Indianapolis office in 1919, he was made sales agent in 1922 and works manager of the Indianapolis works in 1929. In 1943 he was transferred as manager of the Cicero and Melrose Park, Ill., plants.

Bruce L. Simpson

BRUCE L. SIMPSON, president, National Engineering Co., Chicago, comes from a family of foundrymen. His father, Herbert S. Simpson, whom he succeeded as president in 1943, founded the company in 1917. His grandfather, P. L. Simpson, who died in 1917, was a

(*Concluded on page* 174)

Part of the group of British foundrymen who attended the AFA convention



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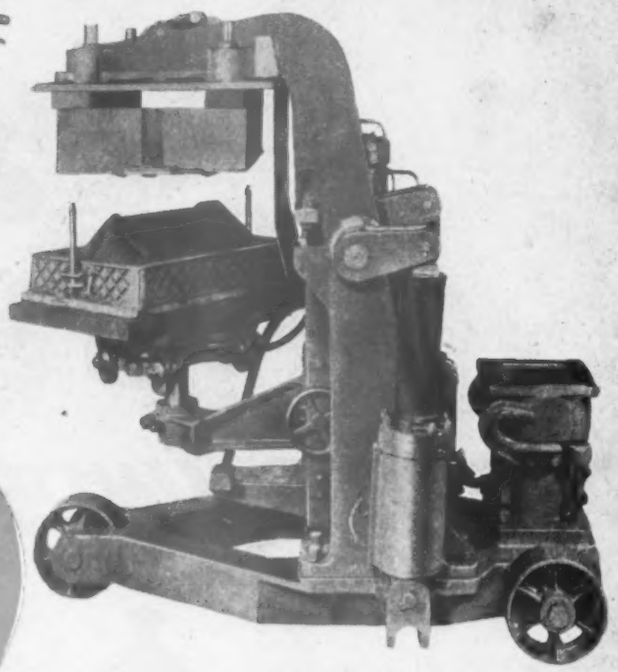

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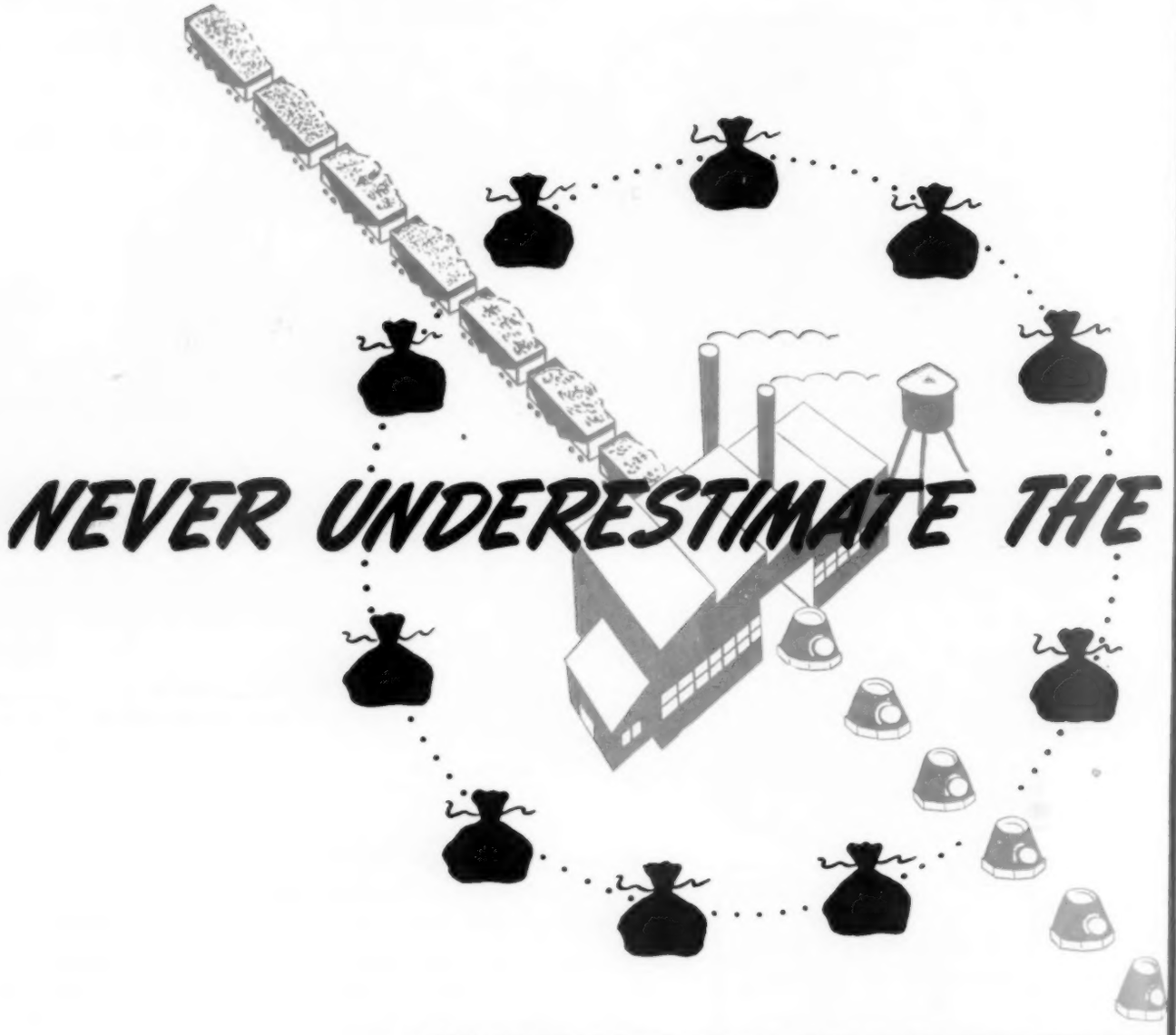

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THE FOUNDRY—
FIFTY FOURTH YEAR

CLEVELAND 13, OHIO

*Our apologies to the Ladies' Home Journal for borrowing their catch phrase but it so aptly serves to point our message that we were helpless. Forgive us.

(*Continued from page* 170)

veteran foundryman and was the inventor of the first gear molding machine, introduced in Minneapolis, many years ago, and later developed the type of sand mixer still known under the family name. Mr. Simpson was graduated from Northwestern University and later received his degree of law at Northwestern Law School. He was vice president of the National Engineering Co. until 1943, in charge of production.

J. E. Kolb

J. E. KOLB, who has been elected a director to represent patternmaking interests on the national board, is pattern shop superintendent of the Caterpillar Tractor Co., Peoria, Ill., and has been associated with that company more than 25 years. Mr. Kolb was active in the recent formation of the Central Illinois Chapter of the AFA in the Peoria, Ill., district.

Harry G. Lamker

HARRY G. LAMKER, one of the active members of the Aluminum and Magnesium Division of the AFA, is the first representative of that group to be elected to the national board. Graduated from Carnegie Institute of Technology, he has been connected with the aluminum foundry industry for nearly 30 years and currently is superintendent of foundries, Wright Aeronautical Corp., Paterson, N. J.

Fred J. Walls

FRED J. WALLS, manager, Detroit office, Development and Research Division, International Nickel Co., New York, was educated at the University of Michigan, where he specialized in metallurgy. He was employed successively by the Packard Motor Car Co., Detroit, and the Wilson Foundry & Machine Co., Pontiac, Mich., where he was made chief metallurgist in 1923. In 1932 he was consultant to Eaton-Erb Foundry Co., Vassar, Mich., now the Foundry Division, Eaton Mfg. Co., and became manager prior to assuming his present position with International Nickel Co. in 1934. A former president of the Detroit Foundrymen's Association, now the Detroit Chapter of the AFA, he was a national director of AFA in 1939-1942 and vice president in 1944-45, serving the current year as president.

FOUNDRY DEVELOPMENTS

Detailed at Chicago Conference

By ERLE F. ROSS
Chicago Editor
THE FOUNDRY

OF 46 technical sessions conducted during the Chicago Production Conference and Show at the Stevens Hotel, Chicago, March 20-22, six sessions were devoted to the foundry industry, foundry practice and castings. This group of meetings was sponsored by the American Foundrymen's Association.

The conference and show was held under auspices of the Chicago Technical Societies Council, which comprises in its membership 47 scientific, engineering and technological societies, for the most part local chapters of national societies. The conference was the peacetime outgrowth of the War Production Conference held the past three years with co-sponsorship of the War Production Board. A new feature in the postwar version was a show in which over 100 exhibitors displayed production machinery, equipment and products, including material handling equipment, tumbling barrels and abrasives, testing and scientific instruments, safety equipment and alloy and precision castings.

Topics of the six foundry sessions were "The Foundry of the Future," "Patterns and Permanent Molding," "Malleable and Gray Iron," "Magnesium Alloys," "Steel Castings," and "Brass and Bronze." Representing the AFA in organization of the program were Oscar Blohm, chief metallurgist, foundry division, Hills-McCanna Co., as general chairman; Bruce L. Simpson, president, National Engineering Co., as vice chairman; and E. R. Young, district manager, Climax Molybdenum Co., as honorary chairman.

"Plant Engineering as It Affects Foundry Operations" was the title of a paper presented by James L. Yates, construction engineer, Worthington Pump & Machinery Corp., Buffalo, at the opening session on "The Foundry of the Future." R. L. McIlvaine, vice president, National Engineering Co., was chairman. Mr. Yates emphasized that pneumatic tools are precision instruments and require the best of care. Referring to dust control in the foundry, he stated that tremendous amounts of air must be handled in the future to meet state codes. The shakeout is a big source of dust, but if a good dust collection system is installed, foundry walls and ceilings can be painted white, and equipment can be made a light color, thereby making a shop a lighter place to work.

Mr. Yates described a very large shakeout which his company has installed in a building outside the foundry, and which has simplified the dust control problem. This shakeout, which has no dead spots, will free a flask 10 ft long, 4 ft wide and 8 ft high of sand in 80 seconds. In some cases, a flask can be lifted off the shakeout in 2 minutes. The speaker asserted that one of the troubles frequently existing with a shakeout is its inability to move sand away fast enough.

"Modernization of Foundries" was a subject discussed by Lester B. Knight, president, Lester B. Knight & Associates, Chicago. A considerable portion of this paper appeared in THE FOUNDRY for April, page 88.

At the session devoted to patterns and permanent molding, William E. Tharpe, foundry technical supervisor, Caterpillar Tractor Co., Peoria, Ill., presented a paper on "Design, Redesign and Interchangeability of Patterns." Co-chairmen were Harry J. Jacobson, proprietor, Industrial Pattern Works, and John Mader, Stewart Die Casting Division, Stewart-Warner Corp.

Require Good Patterns

Mr. Tharpe asserted there is not enough co-operation between the foundryman and the patternmaker. He said that many patternmakers are running foundries today and doing a good job because they know the importance of good patterns. When engineers make changes in product design, they sometimes require alterations in patterns which complicate molding and economical production of castings, with the result that engineers sometimes turn from castings to weldments.

To stop this migration from castings, Mr. Tharpe suggested that when a pattern is redesigned the following questions be asked: 1. Will it lower cost or lessen scrap? 2. Will it increase or decrease machining? and 3. Will it impair the casting? The speaker emphasized the importance to a foundry of selecting foundry equipment, such as flasks, molding machines and sandslingers to give the highest degree in interchangeability.

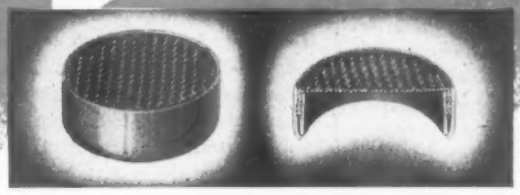
In discussion, it was agreed by Chairman Jacobson, and Oscar Blohm, chief metallurgist, Hills-McCanna Co., that magnesium is a very suitable material for core boxes. Cost is estimated to be not over 10 per cent over aluminum.

Major Jack W. Wheeler, consultant on permanent molding, Springfield, Mass., contributed a paper on "The Design and Production of Permanent Molds," in which he made clear that the British are farther ahead in this technique because they have exchanged ideas freely. They have done things Americans have not tried. Major Wheeler confined his discussion to gray iron. Mold material is carbon steel, without heat treatment. Alloy steel

(*Continued on page* 176)

High Speed Core Production

NO BLOWOUTS! WITH RIENACKER CORE VENTS



SCREEN TYPE—Patent No. 2,263,974

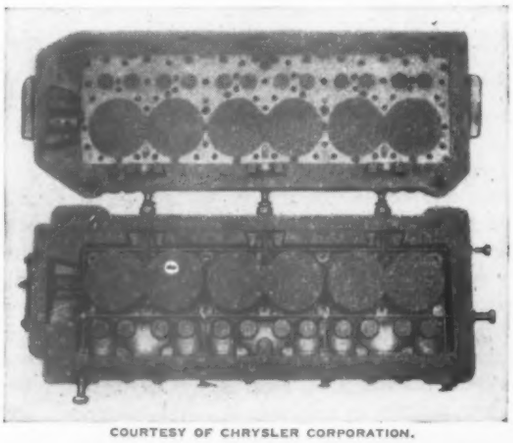
Made from 30 mesh monel screen lapped 3/16" over brass innertube and firmly secured with brass outertube, making a strong, fool-proof unit. Each vent is sized through a die assuring accurate fit. The compression between outer and inner tubes holds screen securely in place without slightest danger of blow-out. Costly work stoppages to repair or replace vents are eliminated.

Use Rienacker core vents (screen type) whenever possible—on all flat surfaces, and on curved surfaces wherever core marks are unimportant. You get fastest air escape with minimum liability of clogging.

Write for information and prices on gas escape vent bushings for use with round or rectangular vent rods. Round bushings in all drill rod sizes; rectangular bushings: 3/32" x 1/4"; 3/32" x 3/8"; 1/8" x 1/4".

SLOTTED TYPE—Patent No. 2,238,506

For CONCAVE and CONVEX RADII. Made of brass, precision slotted for greatest air escape possible with this type of vent. This slotted vent is easily shaped to any curved surface; leaves no core marks on casting.



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This core-box of main water jacket shows replacement of 77 Rienacker core vents (screen type), and 10 Rienacker gas escape vent bushings with both round and rectangular rods.

Order Rienacker core vents and bushings from your supplier, or direct from factory. Deliveries from stock.

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(*Continued from page* 174)

has been tried but when a composition is found to give the best heat resistance, the metal is too hard to machine.

The speaker pointed out that mold cavities must be ground smooth. In the case of thin section castings, this is particularly important, for small marks in the mold may prevent a casting from drawing from the cavity. The best pouring temperature for nonferrous metals, as well as gray iron, is the lowest that will fill the mold. A virtue of permanent molding is that all castings are dimensionally accurate and alike, and the method is used only where its attributes are required.

Two papers were presented at the session devoted to malleable and gray iron, under the chairmanship of W. D. McMillan, chief metallurgist of foundries, International Harvester Co. "Duplexing of Malleable Iron" was covered in the first by W. R. Jaeschke, foundry engineer, Whiting Corp., Harvey, Ill. He pointed out that the cupola is one of the oldest of melting units but one that is increasing in popularity. It is an efficient melting unit.

As for the air furnace, Mr. Jaeschke stated that although a sand bottom is satisfactory for cold charges, it does not last long enough for duplexing practice. Reason is insufficient resistance to heat stock. Factors which must be watched to obtain efficient duplexing are good synchronism of operations; careful choice of materials, particularly coke which must be dense; use of good scrap—free from rust with an adequate amount of heavy cross section; a conscientious man handling the charge make-up; little limestone flux; and a good control system.

Cast Iron Resists Corrosion

In the second paper at this session—"Application of Cast Iron in the Chemical Industry"—James E Kearney, chief engineer, Swenson Evaporator Co., Harvey, Ill., described the properties required in cast iron used essentially in evaporators and auxiliary equipment. A large number of slides illustrated that paper. Mr. Kearney asserted that much cast iron is used in handling the flow of liquids and gases where corrosion is not too great. Steel is used where heat transfer is involved. In cast iron, corrosion resistance is much better than steel, the form and quantity of carbon being responsible. The skin of cast iron is particularly resistant because of the iron-silicon combination. Sometimes silicon is added to the mixture, but high-silicon iron is hard to machine and is brittle. Additions of copper, nickel, molybdenum and chromium also are used, these serving to make the iron more dense.

The session on magnesium alloys, chairmanned by Oscar Blohm, chief metallurgist, foundry division, Hills-McCanna Co., featured five papers. In the first, Marvin E. Gantz, metallurgist, American Magnesium Corp., Cleveland, discussed "The Importance of Small Additions of Calcium in the Manufacture of Magnesium Alloy Products." Nonferrous foundrymen are not in agreement on the use of calcium, but the author considered the addition as important in casting alloys as in wrought products.

The calcium is kept in kerosene and is plunged into the melt to give an addition of about 0.05 per cent. The metal is poured within 10 minutes after the addition: In the opinion of Mr. Gantz advantages of adding calcium include: 1. Reduces microporosity—more in heavy sections than thin-wall sections; 2. Facilitates solution heat treatment operations—shortens them, and 3. Reduces rate of oxidation of molten metal. Among possible disadvantages, he listed a tendency to coarse grain, higher scrap because of cracks, and production of deleterious skins.

REGIONAL CONFERENCE

First regional foundry conference to be held in the Chicago area since 1941 is scheduled for Thursday and Friday, Nov. 21-22. Headquarters will be at the Hotel Continental. The conference will be sponsored jointly by the Chicago and Central Illinois Chapters of the American Foundrymen's Association. The general committee arranging the event is headed by Alfred W. Gregg, executive engineer, foundry equipment department, Whiting Corp., Harvey, Ill.

"A Study of the Effect of Certain Mold Materials and Practices Upon the Properties of Magnesium Casting" was the title of a paper contributed by J. G. Mezoff and M. V. Chamberlain, Dow Chemical Co., Midland, Mich.

A paper prepared by Dr. G. H. Found, design engineer, Dow Chemical Co., Midland, Mich., and presented in his absence by R. E. Nelson, research metallurgist, same company, bore the title "Serviceability Experience as Affected by Metallurgical Defects and Design in Magnesium Casting." It was emphasized that in determining the relationship between subsurface microporosity and serviceability, more information is needed on fatigue behavior. Internal conditions appear to have little effect on serviceability, as compared with surface defects and design features.

A paper, "A Practical Discussion of the Pumping of Magnesium Alloys," by A. T. Peters, Dow Chemical Co., Midland, Mich., proved most interesting. This related the method which has been adopted and standardized for pumping molten magnesium from one large pot to another in the process of manufacture. Although siphons and cylinder pumps have been tried and can be used, the choice of equipment has fallen on centrifugal pumps. These are preferably air motor operated, although direct-current motors also can be used. The pumps, with the motor on the top end, are made from carbon steel and are lowered into the bath.

These pumps have been used to transfer metal as far as 25 feet, from melting pots to pouring pots or to ingot molds. The metal could be pumped greater distances, if necessary. The pipe through which the hot metal passes is in some instances heated by passing electricity through it, the heat being generated by the resistance of the pipe. The author pointed out that metal can be pumped from a pot faster than any other method of unloading, and by skillful raising and lowering of the pump inclusion of dross and flux is avoided. The pumps further can be used as agitators. In answer to a question, Mr. Peters stated that in his opinion it would be feasible to pump metal from melting pots to molds passing a pouring station on a conveyor. As to whether this would be economical would depend upon amount of metal being handled and cost of the installation.

Produce Sound Magnesium Castings

Final paper at this session was "Interrelation of Various Factors Determining the Importance of Microporosity in Magnesium Alloy Castings," by L. W. Eastwood and J. A. Davis, Battelle Memorial Institute, Columbus, O. This dealt primarily with the effect of degassing the metal and riser size on microporosity or soundness. Maximum soundness, the speaker asserted, is obtained through use of degassed metal, adequate risers and metal with the widest freezing range.

At the session on steel, C. E. Sims, Battelle Memorial Institute, Columbus, O., presented a highly technical paper on "Low Temperature Properties of Certain Cast Steels." In a second paper, G. A. Lillieqvist, director of research, American Steel Foundries, East Chicago, Ind., spoke on "Metallurgical Developments in the Production of Steel Castings." This consisted principally of many slides and accompanying explanations.

Mr. Lillieqvist declared that so few people know the progress made recently in steel casting, but more are familiar with progress in rolled steel. Castings have kept pace with new developments, including heat treating, flame hardening, nitriding, carburizing, corrosion resistance, fatigue characteristics and heat resistance. Tensile strengths of steel castings now cover a range from 60,000 to 200,000 psi.

(*Concluded on page* 178)

NAMES WORTH REMEMBERING...

STASSANS

... for his invention, in 1898, of first practical rocking furnace heated by horizontal electrodes

INTERNATIONAL *for* Graphite ELECTRODES *of* Highest Purity

UTMOST freedom from contamination due to pick-up in high quality steels made in electric furnaces goes hand in hand with the use of INTERNATIONAL Graphite Electrodes—for these electrodes are as pure as modern methods, utmost care and specialized experience can make them from the best raw materials obtainable. Purity of INTERNATIONAL Electrodes averages 99.5%—and the other .5% consists mostly of *inert* oxides and silicates, negligible even in the most exacting electric furnace work.

This high degree of purity, along with a dense, firm structure that minimizes spalling in use, helps explain the popularity of INTERNATIONAL Electrodes. They have been consistently used for years by leading *producers* of fine electric furnace steels and by principal electric furnace *manufacturers* as well. These users know that the same care in selection of materials and in manufacturing that gives INTERNATIONAL Electrodes their extreme purity also gives them the other properties listed here—properties that are so essential to low electrode cost per ton of steel production.

OTHER ADVANTAGES

- Slow consumption
- High current capacity
- Low rate of oxidation
- High thermal conductivity
- Consistently uniform properties and dimensions
- Low cost per ton of production

International Graphite & Electrode Corp.

SAINT MARYS, PA.

276

(*Concluded from page* 176)

ASTM now has 56 classifications of steel castings. In recent years, several nondestructive tests have been developed.

Among matters discussed by the speaker were smooth surfaces, pleasing shapes, blowholes from gassing, use of killed steel to eliminate blowholes, special deoxidizers, fluidity and thin sections. Mr. Lilliequist devoted some time to reversed pouring and special pouring procedures to obtain solid castings. In some instances, castings not castable in one piece are made in parts and welded together. He described the use of pads to get solid castings despite the necessity of subsequently burning them off; blind risers and atmospheric feeding. In conclusion, he pleaded for closer co-operation between design engineers and steel foundrymen.

Brass and bronze commanded attention at the final conference session at which A. W. Gregg, executive engineer, equipment division, Whiting Corp., Harvey, Ill., presided. Carl O. Thieme, vice president and work manager, H. Kramer & Co., gave an off-the-record address on "A Metallurgist Views Europe from the Beaches to Berlin." Mr. Thieme was a member of the delegation which the government sent to Europe in late 1945 to study and recommend what disposition should be made of battlefield scrap. He supplemented his address with a fascinating movie photographed on the trip.

Concluding the session, Walter W. Edens, technical director, Ampco Metal Inc., Milwaukee, spoke on "Bronze As an Engineering Material." Copper-tin, copper-zinc and copper-aluminum alloys were the ones he dealt with specifically. Proporational limit, rather than tensile strength, he declared, is the very important consideration for engineering applications of bronze.

In determining design of properties, Mr. Edens listed consideration of the following items: Proportional limit, impact strength, endurance limit (fatigue), modulus of elasticity, elastic limit in compression, brinell hardness, coefficient of expansion and weight. In viewing specification properties, attention should be focused on tensile strength, yield strength, elongation, reduction of area, brinell hardness, method of manufacture and chemical composition.

Three luncheon meetings featured the Production Conference and each was attended by close to 1000. In an address written for delivery at one of these, Louis Ruthenburg, president, Servel Inc., Evansville, Ind., pointed a gloomy outlook for the future.

Mr. Ruthenburg warned that with the United States faced with the most fantastic debt ever created in the world's history and now caught in inflation, the nation must pay for the war by choosing between lowered living standards or immensely increased productive efficiency.

Speaking at the luncheon on the opening day of the conference, Maj. Gen. Leslie R. Groves, who supervised development of the atomic bomb, asserted that scientists believe commercial electric power can be produced from atomic energy in competition with coal in about ten years if the present pace of experiments were continued.

Named Managing Editor

WILLIAM G. GUDE

William G. Gude has been appointed managing editor of THE FOUNDRY. He has been associated with the Penton Publishing Co. since 1926, following graduation from Purdue University, and has been located in the Pittsburgh, Chicago, New York and Cleveland offices of that company. He is a former secretary of the Chicago Chapter of the AFA. Mr. Gude has served as associate editor of THE FOUNDRY at Cleveland since 1943.

OPEN HEARTH COMMITTEE

Resumes National Meetings

NATIONAL meeting of the Open Hearth Committee, American Institute of Mining & Metallurgical Engineers were resumed in April after having been interrupted for the first time in 21 years because of wartime restrictions. The conference held at the Palmer House, Chicago, Apr. 24-26, was attended by 794.

The 1947 National Conference will be held at the Netherland-Plaza Hotel, Cincinnati, with a plant visitation at the Middletown, O. plant of the American Rolling Mill Co. scheduled for Apr. 21, and technical sessions for Apr. 22-23. The 1948 conferences will be held in Pittsburgh.

A. P. Miller, general chairman of the Open Hearth Committee, in opening the conference pointed out that problems involving costs and quality of open hearth production will demand the attention of operators for many years to come. Customer requirements and competition with other metals, he stated, will emphasize the need for improved quality. With improved methods must come a cost reduction, further planned economy, development of labor-saving devices and an increase in ingot yield.

Basic open hearth practice mainly was devoted to a discussion of phases in connection with the production of steel for ingots, and related to checkers, limestone, substitutes for pig iron, labor-saving devices, cleaning checkers and flues, slag thimbles and cars, molds, mold coatings, basic refractories, and nozzles. With reference to limestone it was pointed out that the tendency toward use of small size was bound to continue although there are certain difficulties encountered in unloading, freight costs and handling. Use of coke as a substitute for pig iron seems to show a better ingot yield. Carbon in the form of coke has to be about double that in the form of pig iron.

Saving in labor is accomplished at one plant by handling brick on pallets with fork-type trucks. In another debris from slag pockets is removed by mucker machines which dump into conveyors unloading into hopper cars. Removing flue dust from checkers by vacuum cleaning is saving considerable money as well as man-hours. According to one operator low fusion type nozzles afford smooth pouring operations. The tar nozzle has been found much stronger than the ordinary type. In one plant trouble with dripping was remedied by soaking the nozzles in tar for 48 hours. After drying for 24 to 48 hr the nozzle was placed in operation.

In the only session dealing exclusively with the acid open hearth, consideration was focused upon operations and quality. E. T. Crocker, open hearth superintendent, Continental Foundry & Machine Co., East Chicago, Ind., was chairman.

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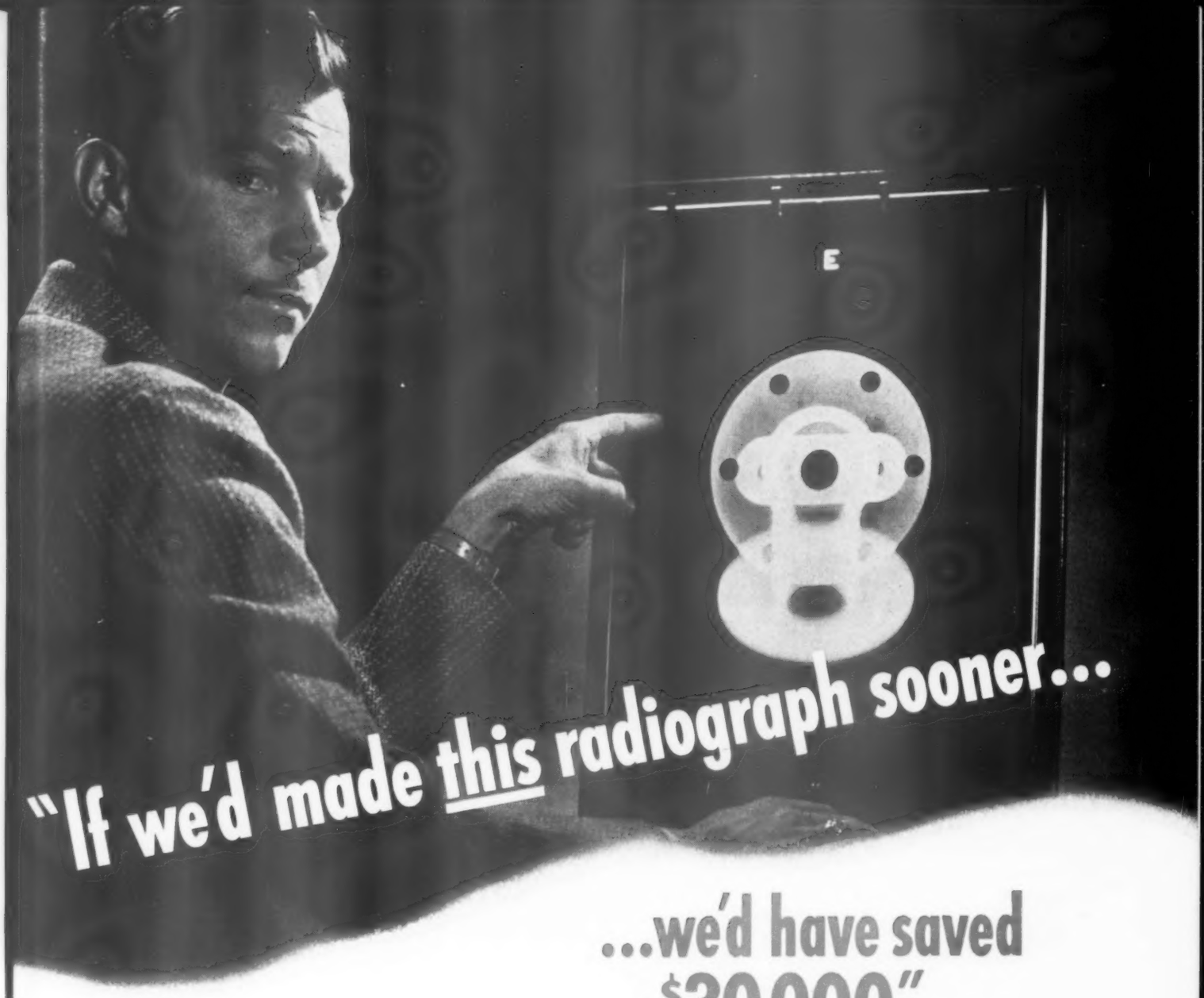

"If we'd made this radiograph sooner...

...we'd have saved $30,000"

A manufacturer of valves, whose foundry technic seemed "okay," decided pilot radiographs weren't needed. But when machining was done and the valves assembled, enough were found defective to cause a loss of many thousands of dollars.

Radiography, put to work at the right time and place, pays off. Men who have figured *cost-wise* what it can do for them . . . to improve design, speed production, and lower costs . . . make full use of x-ray.

Radiographs show your engineers where to correct faulty design . . . how to reduce weight safely . . . how to cut costs at many stages of manufacture . . . how to build in extra dependability.

Order-jammed foundries get a welcome production spurt when radiography shows how to get into sound casting production fast. High-value, high-volume machine shops operate at rock-bottom cost when radiographic inspection keeps internally unsound castings off the production line.

Welding gains acceptance . . . new markets . . . higher volume . . . because radiographs prove weldments sound.

And these are only a few high spots in radiography's list of industrial functions. You can find more—if you look for them—right in your own plant. Why not get together with your radiographer or the local x-ray dealer and see if you are missing any chances to make radiography pay extra dividends? Or write to

Eastman Kodak Company, X-ray Division
Rochester 4, New York

Radiography —another important function of photography

Kodak

(*Concluded from page* 178)

and C. F. Christopher, engineer of the same company, was co-chairman.

A paper on control of open hearth heats contributed by A. E. Reinhard, Acid Open Hearth Association, Pittsburgh, dealt essentially with slag fluidity. The speaker asserted that slag fluidity control is being used to great advantage in many acid shops. Fluidity as measured by the fluidimeter standardized by the association was shown to be an accurate measure of melt temperature. It indicates within 10 minutes the end of the melt-down period, shows the proper time for ore additions, and also indicates when the additions have been absorbed in the melt.

Considerable interest was displayed in the matter of superheated air versus superheated steam for atomization of fuel oil, but factual data available proved too meager to permit a conclusion. Heppenstall Co., Pittsburgh, is making a trial of superheated air, but A. R. Altman, superintendent of open hearth, stated more experience is needed before its merits can be appraised. Major reason for trial of air was the probability of not desiring to operate the steam producing department continually, at the same time requiring the melting department to operate without interruption.

Company believes it could use to advantage more air pressure than the 100 psi available and is preparing to get it. With superheated steam, the pressure is about 130 psi, which seems to result in greater furnace erosion. The air appears to melt the entire surface instead of cutting a path through the charge. In either case, superheat is 600 F.

According to Mr. Altman, the air stands in a favorable light over steam, but the final answer may be in relative costs.

INTERNATIONAL FOUNDRYMEN'S GROUP

Takes Steps To Form New Congress

AT THE AFA Foundry Congress in Cleveland, May 9, an informal meeting was held of representatives of members of foundry technical associations affiliated with the International Committee of Foundry Technical Associations which, before World War II, regulated international congresses and fostered international relations and good will between foundry technical associations.

Representatives attending the meeting were: F J. Walls, president, American Foundrymen's Association; Tom Makemson, secretary, Institute of British Foundrymen; Vincent Delport, AFA representative on the International Committee; Dr. Ladislav Jenicek, official delegate, Czechoslovak Foundrymen's Association; Marcel Debrock, representing the French Foundrymen's Association; J. H. Ubbink, representing the Foundry Association of Holland; M. Remy, representing the Foundry Association of Belgium; Frank G. Steinebach, chairman, AFA International Relations Committee; W. W. Maloney, secretary, American Foundrymen's Association.

The following resolution was passed:

RESOLVED, THAT:—A letter be sent to the foundry technical associations of the friendly nations that were affiliated with the International Congress of Foundry Technical Associations before the war, recommending that they appoint an official representative, with a view of attending a meeting, later in the year, to discuss the formation of a new International Congress of Foundry Technical Associations. The committee would have for its objects:

The fixing of the calendar of world and other international congresses;

The regulation of exchange papers to be presented at these congresses;

The exchange of publications between the affiliated technical associations;

All other matters conducive to the closest collaboration between foundry technical associations.

The associations will also be asked to suggest matters to be placed on the agenda of the proposed meeting.

Participants in the recent Cleveland meeting of international foundrymen included: Standing, left to right—J. H. Ubbink, Marcel Debrock, Dr. Ladislav Jenicek, Frank G. Steinebach, Vincent Delport, William W. Maloney; seated, left to right—Tom Makemson, Fred J. Walls, M. Remy

Mexaloy Super Refractory Saves Linings and Equipment

Tough, non-fusible protective lining for ladles, spouts, runners and cupolas

Mexaloy is the ideal material for protecting refractory linings of cupolas, ladles, runners and spouts in both foundries and steel plants. Mexaloy makes the body containing it highly resistant to sudden, violent temperature changes and thus avoids spalling and cracking of the refractory. Practically infusible, it will not melt or change its character under the action of molten metal. Neutral and chemically inert, Mexaloy's presence insures resistance to fluxing and corrosive action by molten metals and slags. It provides a low-friction, surface which allows no foreign body adherence.

Mexaloy is extremely easy to apply. Mixed with clay, ground fire brick and water according to a simple formula, the resulting mixture is easily applied by tamping. Linings containing Mexaloy last longer. For example, in the spouts of open Hearth furnaces where the usual loom layer has to be replaced after every one or two heats Mexaloy linings invariably last more than 10 heats—sometimes as many as 30. In Foundry cupolas Mexaloy linings last longer and improve metal quality.

To greatly reduce "shut downs" in your steel plant or foundry due to refractory replacements, it will pay you to use Mexaloy. Write today for further information.

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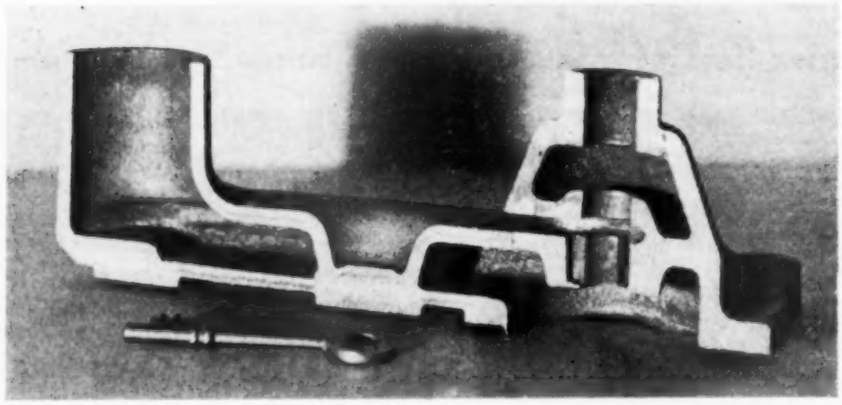
SODIUM HYDRIDE BATH

Used in Cleaning Castings



Section of casting descaled and desanded by the process described here

A PROCESS which is receiving more and more attention for descaling and desanding castings is that developed by DuPont, where a sodium hydride bath is used. So far, most of the descaling by this method has been confined to the stainless steel and alloy mills. However, new uses are being discovered, one of the more successful of these being the descaling and desanding of ferrous castings and forgings. This is being accomplished by a large midwestern manufacturer of oil-pump bodies and parts made of gray iron.

The process employs a sodium hydroxide bath in which sodium hydride, a powerful reducing agent, is present. This combination acts to remove oxygen from any of the oxides formed on the metal being descaled or desanded. Consequently, even so refractory a material as sand will be modified chemically. Such modification greatly facilitates its removal from the surface of castings when the material is treated in a sodium hydride bath followed by the usual washing operations.

The setup adopted by this manufacturer is simple. It utilizes the Ajax-Hultgren salt bath furnace, made by Ajax Electric Co., Inc., Philadelphia, employing the well-known immersed electrode heating principle. The entire operation consists of the following:

The work is first immersed in the bath of molten caustic soda which contains a small percentage of sodium hydride. The temperature is held to within ± 5°, of 700 F at all times. This is accomplished by the vigorous stirring action caused within the bath by electromagnetic forces which, in turn, are created by the grouping and design of the closely-spaced electrodes. This bath loosens any sand, scale or foreign material adhering to the surface of the castings or forgings. The sodium hydride is produced by the chemical reaction of sodium and hydrogen by means of a "generator" within the caustic soda bath itself.

The work is next immersed in a water quench, operating at room temperature. This removes the loosened material and any caustic which might have been picked up in the reducing bath. Another water rinse at room temperature prepares the work for an acid dip.

The work is then placed in dilute sulphuric acid for no more than one minute. This removes any iron particles reduced from iron oxide which might still be adhering to the surface of the metal. This operation may be omitted if desired, as very little cleaning is accomplished

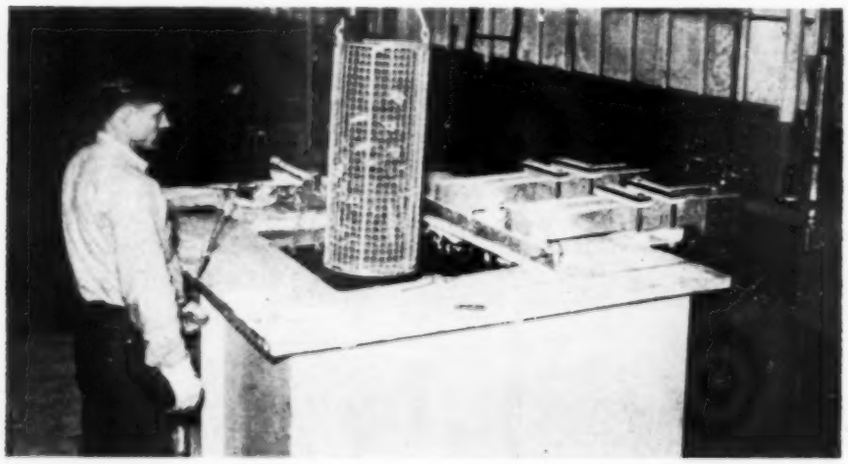
The final step is a neutralizing and corrosion-retarding bath, operating at 200 F. This is made up of weak sodium cyanide (0.2 oz NaCN per gal), which serves to neutralize any acid remaining on the surfaces of the work. At the same time it provides protection against corrosive action.

Capacity of the unit shown in the illustration is about 1250 pounds per hr, gross. Of course, this depends entirely on the size and shape of the work to be treated. The same may be said of the time cycle which, in this case, is about 15 minutes.

Baskets Last Indefinitely

It is interesting to note that material can remain in the reducing bath for hours without causing any injurious effect upon the base metal of the work. The same is true of the fixtures or baskets used for immersing the work. They will last indefinitely, unless damaged by mechanical means—and they need not be made of alloy steel.

Due to automatic temperature conrol in both the reducing bath and the neutralizing and corrosion retarding bath, no skilled labor is required for operating the entire setup. Working conditions are excellent around this installation, for there are no fumes or detrimental vapors exuding from the individual units. Possibility of electrical shock is not a hazard, for only 18 volts are required to heat the bath. Maintenance on the furnace, including the steel pot, electrodes and temperature control equipment, is negligible. All of the equipment requires little space and can, if desired, be placed in line of production as a completely mechanized unit, requiring only one or two operators for loading and unloading the work.



Batch of gray iron castings being lowered into sodium hydride bath. The bath, operating at about 700 F, is heated by the two pairs of electrodes shown at the right. Capacity of the furnace is 1250 lb per hour

---

Pottstown Pipe Products Co., Pottstown, Pa., manufacturer of pipe nipples, has been acquired by the National Roll & Foundry Co., Avonmore, Pa.

sound, strong—and light!

—the modern casting standard

It takes something more than soundness and strength . . . it takes *lightness,* too . . . for the job required of many castings today. That job is cutting product weight, without risk of weakness.

That's magnesium's job. More and more manufacturers are calling for magnesium castings for their unique combination of lightness, soundness, strength. Lighter products—better products—are being made as a result.

A full line of magnesium casting alloys and accessory materials is offered by Dow, as well as the services of its own complete foundry. Behind these products and services stands the experience of more than 29 years in magnesium development. Complete magnesium engineering service is available to you through the nearest Dow office.

Ready . . . to make products move!

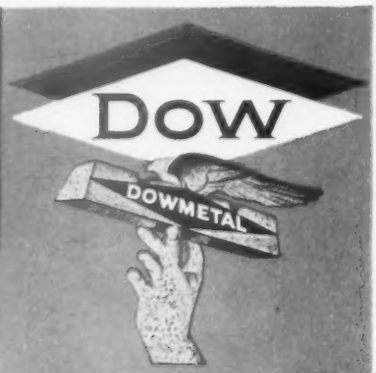
MAGNESIUM

LIGHTEST OF ALL STRUCTURAL METALS

Dow's magnesium line includes casting alloys for a wide variety of property needs, as well as many fluxes and accessories.

Standard magnesium shop practice is simple and well defined. Information is readily available to concerns interested in magnesium work.

Excellent machinability of magnesium permits faster and more economical working with hand tools than most other metals.

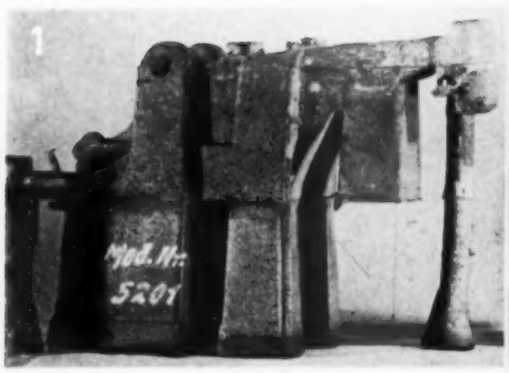


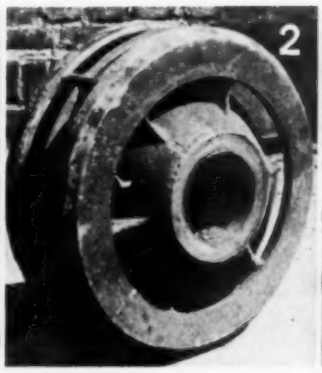
MAGNESIUM DIVISION • THE DOW CHEMICAL COMPANY, MIDLAND, MICHIGAN

New York • Boston • Philadelphia • Washington • Cleveland • Detroit • Chicago • St. Louis • Houston • San Francisco • Los Angeles • Seattle

GERMAN Steel Foundry Practice

Photos by MAX T. GANZAUGE
General Railway Signal Co.
Rochester, N. Y.





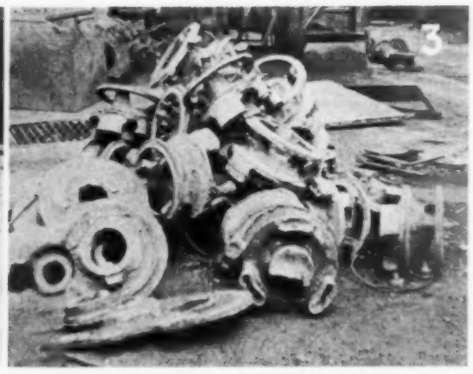
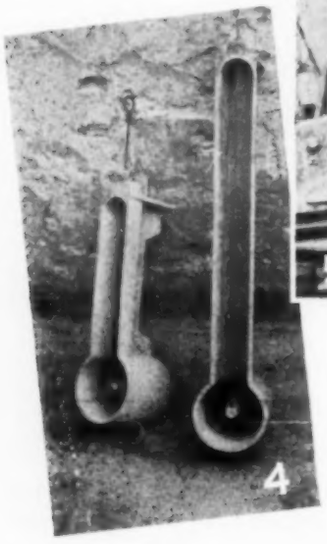
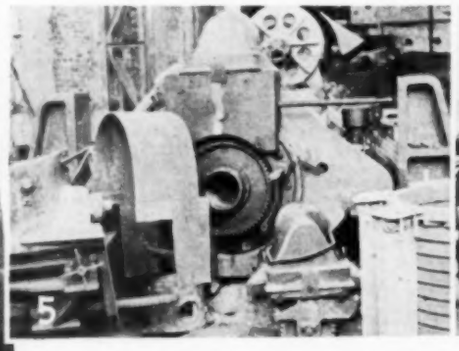


Fig. 1—German steel aircraft casting. Excessive risering resulted in a low yield, averaging 15 to 20 per cent. Rejections ran up to 25 per cent

Fig. 2—Drive wheels of German tank. Risers were cut off on a circular saw and the cope side was rough turned before the castings were shipped out

Fig. 3—Idler wheels for tanks, made by Linden Steel Foundry. Attached risers show good feeding





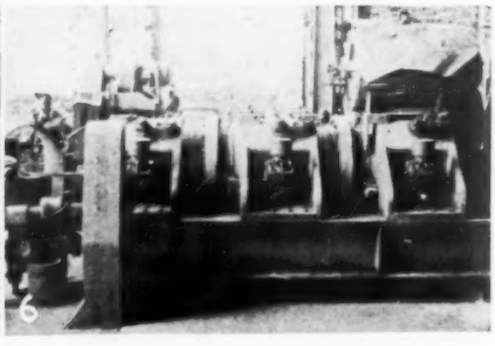
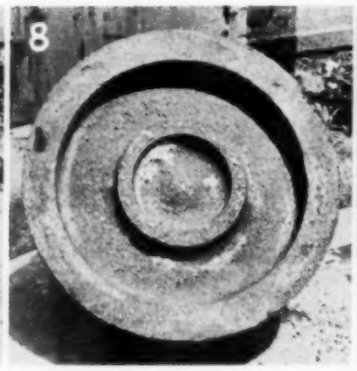


Fig. 4—Cores from these metal coreboxes were used to check fluidity of steel prior to tapping. Length of ¼-in. round cast rod gave indication of fluidity and temperature of the steel

Figs. 5 and 6—Side and front views of horizontal centrifugal casting machine, water cooled. Produced steel castings weighing up to 3 tons

Figs. 7 and 8—Cope and drag views of a centrifugally-cast steel crankcase. Pouring sprue also served as riser

Fig. 9—Same crankcase as in previous figures but cast statically. Notice large risers and heavy padding required to obtain soundness in casting. Pouring weight is nearly double that of centrifugal casting



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TROUBLE-FREE production of quality castings doesn't just happen. The skill and know how of foundry or die-caster is of prime importance. But the most skilled of craftsmen must have the right raw material to work with.

If your job calls for an aluminum alloy, specify S-G for results. Every step in its production is checked constantly by skilled laboratory men using the most modern equipment available. You can rely on S-G alloys . . . they meet your most rigid specifications . . . they help you get the results that mean profits.

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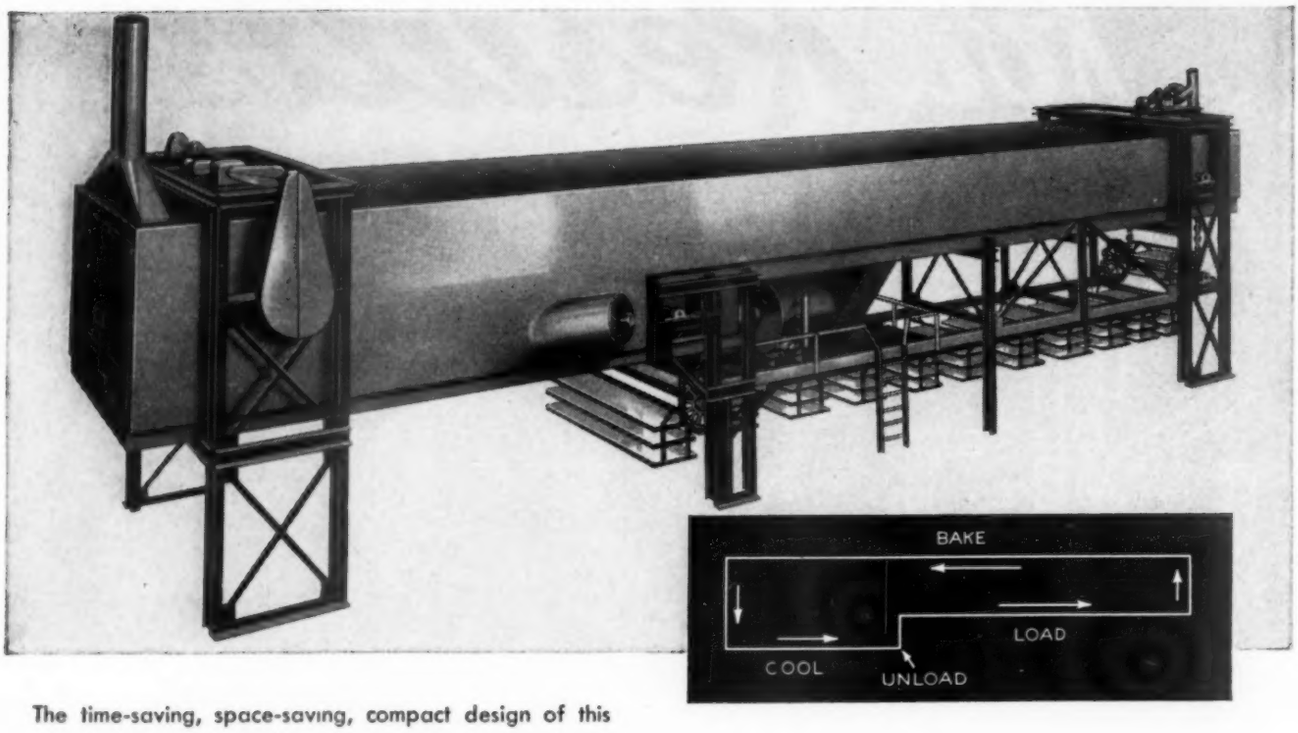

New HORIZONTAL CORE OVEN . . . . . offers many cost saving advantages!

The time-saving, space-saving, compact design of this new Horizontal Core Oven is characteristic of Young Brothers' Engineering. Into it went the skill and confidence of many years of experience . . . also a thorough knowledge of the job to be done and the production problems involved.

This new core oven can be installed in practically any building without making any major structural changes.

The coremakers are located right next to the oven so that they can load the cores directly on the moving racks thus eliminating the necessity of transporting them on hand trucks or a conveyor from the core room. The location of the coremakers, at the oven, also saves core room space.

The size of the loading racks can be varied and the shelves can be adjusted to accommodate cores of many sizes and shapes.

Besides allowing for the removal of exhaust gases at the point of greatest concentration, the new oven design provides an effective cooling zone for the cores and assures comfortable working conditions for the coremakers.

This New Horizontal Core Oven is Young Brothers' answer to the demand for better core baking equipment. It is YOUR answer to the need for lower production costs and higher operating efficiency.

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A GLOSSARY OF TERMS EMPLOYED IN THE FOUNDRY

(Continued from May issue)

SHRINK BOB—See blind riser.

SHRINK HOLE—A hole or cavity in a casting resulting from contraction and insufficient feed metal, and formed during the time the metal changed from the liquid to the solid state.

SHRINK RULE—Patternmaker's rule graded to allow for metal contraction.

SHRINKAGE CAVITY—See shrink hole.

SIEVE—A device with meshes of wire or other material for separating fine material from coarse material.

SILICA—Silicon dioxide, SiO_2, occuring in nature as quartz, opal, etc. Molding and core sands are impure silica.

SILICA FLOUR—Silica in finelv divided form.

SILICA WASH—Silica flour mixed with water and other materials to form a brushable or sprayable facing material.

SILICON—One of the elements with the chemical symbol Si whose formula weight is 28.06; specific gravity 2.4, and melting point 1420 C.

SILICON-ALUMINUM—An alloy of 50 per cent Si and 50 per cent Al used for making silicon additions to aluminum alloys, and often termed an intermediate or hardener alloy. Melting point is 1070 F.

SILICON BRASS—A series of alloys containing from 0.5 to 6 per cent Si, 1 to 19 per cent Zn, and remainder substantially copper.

SILICON BRONZE—A series of alloys containing from 1 to 5 per cent Si, 0.5 to 3 per cent Fe, under 5 per cent Zn, under 1.5 per cent Mn, and remainder substantially copper.

SILICON BRIQUETS—Crushed ferrosilicon bonded with a special refractory cement and formed into briquets. Available in two sizes containing respectively 1 lb and 2 lb metallic silicon.

SILICON CARBIDE BRIQUETS—Silicon carbide in briquet form used as an inoculant and deoxidizer in cupola melted gray iron.

SILICON-COPPER—An alloy of silicon and copper available in two types containing 10 and 20 per cent silicon. The 10 per cent grade has a melting point of 1500 F while the 20 per cent grade melts at 1650 F. Used as a deoxidizer and hardener in copper-base alloys.

SINK HEAD—See riser.

SKELETON PATTERN—A pattern made in outline to reduce cost.

This is the seventh installment of an extensive glossary of foundry terms compiled by Edwin Bremer from a wide variety of sources. In the development of this material a great amount of help has been secured from the *Steel Castings Handbook* published by the Steel Founders' Society of America, Cleveland; *American Malleable Iron* published by the Malleable Founders' Society, Cleveland, and from unpublished work of a Committee on Foundry Nomenclature of the American Foundrymen's Association, Chicago. THE FOUNDRY wishes to thank all sources from which this material has been obtained.

THE EDITORS

SKIM GATE—An arrangement which changes the direction of flow of molten metal in the gating system and thereby prevents the passage of slag and other extraneous materials beyond that point.

SKIMMER—A device or tool for removing slag and dross from surface of molten metal.

SKIN—The surface of a mold or casting.

SKIP HOIST—Basket, bucket or car drawn on rails with pulleys; usually in a sloping framework; for carrying or transporting materials; used in charging cupolas and blast furnaces.

SKULL CRACKER—See drop ball.

SLAG—A nonmetallic covering on molten metal as the result of the combining of impurities contained in the original charge, some ash from the fuel, and any silica and clay eroded from the refractory lining. Except in bottom pour ladles it is skimmed off prior to pouring the metal.

SLEEK—A term applied to various molder's tools used to impart smoothness to the mold face.

SLEEVE BRICK—A protective refractory covering for the stopper rod in bottom-pour ladles.

SLICK (SLICKER)—See sleek.

SLIP BOX, CASE OR JACKET—See jacket, mold.

SLIP FLASK—See flask, snap.

SLURRY—Thin loam.

SMELTER—An individual or firm which wins metals from ores, or which melts, treats or refines scrap metals and alloys for further use.

SNAG—Removal by grinding, of fins and rough places on a casting.

SNAGGER—Man or machine engaged in grinding rough places from castings.

SNAP FLASK—See flask, snap.

SODA ASH—Commercial sodium carbonate.

SOLDER—Usually an alloy of two or more metals used for joining other metals together by surface adhesion. Most common solder is an alloy of tin and lead while hard solder is composed of copper and zinc. Silver solder is an alloy of silver and copper with or without zinc.

SOLID CONTRACTION—Shrinkage or contraction as a metal cools from the solidifying temperature to room temperature.

SOLIDIFYING CONTRACTION—Shrinkage or contraction as a metal solidifies.

SOLIDUS—Temperature at which freezing is completed. Below that temperature all metals are completely solid.

SORBITE—A late stage in the tempering of martensite when carbides have grown so that the structure is distinctly granular in appearance.

SOW—Iron in the main runner which supplies the pigs in a blast furnace pig bed.

A GLOSSARY OF TERMS EMPLOYED IN THE FOUNDRY

SPARK ARRESTER—Device over the top of a cupola to prevent emission of sparks.

SPHEROIDIZED CEMENTITE—The globular condition of iron carbide after a spheroidizing treatment. See granular pearlite.

SPIEGELEISEN—A high manganese pig iron containing 15 to 30 per cent Mn and used in bessemer and open hearth steel making practice.

SPINDLE—An upright post on which the sweep arm revolves in sweeping up a mold.

SPONGY—A porous area in a casting.

SPRAY GUN—See sprayer.

SPRAYER—An air operated apparatus for applying liquids on the surface of a mold or core.

SPRIG (BRAD)—Mold surface finish nail.

SPRING CHAPLET (SPRINGER)—A type of chaplet helical in form.

SPRUE—The vertical portion of the gating system where the molten metal first enters the mold.

SPRUE BUTTON—Attached to the cope pattern to indicate where the sprue should be cut.

SPRUE CUTTER—A piece of tubing cuts the sprue hole through the cope. Also a shear-type machine for removing the sprue and gates from the casting.

SPRUING—Removing gates and risers from castings after the metal has solidified.

STACK—Portion of a cupola above the melting zone.

STAGE—Charging platform.

STAKE—A guide for the cope on a floor mold.

STAMP BACK—See print back.

STAR, TUMBLING—See jack star.

STEADITE—A hard structure, phosphorus-rich component found in gray iron, containing 10.2 per cent P and 89.8 per cent Fe.

STOP OFF—To shorten or change a mold.

STOP OFF STRIP—Reinforcing members on frail patterns. Impressions later filled with sand.

STRAIN—The change per unit of length in a linear dimension of a body. Change accompanies a stress measured in inches per inch of length.

STRAINED CASTINGS—Molten metal poured into the mold too fast, raises the cope slightly from the drag and produces an oversize casting with protruding fins. Also over size casting from weak mold.

STRAINER CORE—A small perforated core in the sprue, runner or gate to prevent entrance of slag and other extraneous material into the mold cavity.

STRAINS, CASTING—Strains produced by internal stresses resulting from unequal contraction of the metal as the casting cools.

STRAW ROPE—See braided straw rope.

STREAM—Metal as it flows from the furnace or ladle.

STRESS—Intensity of internal distributed forces or components of force which resist a change in the form of a body. Stress is measured in force per unit area.

STRESS RELIEVING—Heat treatment to remove stresses or casting strains.

STRETCHER—Wood or metal bar to hold crane chains apart.

STRICKLE—Wood or metal form for imparting shape to part of a mold or core.

STRIKE—See strike off.

STRIKE OFF—A straight edge to cut the sand level with the top of the drag or cope flask.

STRIPPING MACHINE—A device for removing the pattern from a mold or a core from the corebox.

SWAB—A piece of hemp or other material to put water in the sand around a pattern or to put liquid facing on the surface of a mold or core.

SWEAT—Lead or other metal coming out on the surface of a casting in small globules.

SWEEP—To form a mold or core by scraping the sand with a form sweep having the desired profile.

SWEEP ARM—Revolving arm to which the sweep or profiled form is attached.

SWEEP BOARD—Scrapes the sand to the desired shape in sweeping a mold or core.

SWELL—An enlargement on the face of a casting, due to yielding mold face.

SULPHUR—One of the elements whose chemical symbol is S. Its formula weight is 32.06; specific gravity 2.046; melting point 120 C.

TAP—To withdraw a molten charge from the melting unit.

TAPPING BAR—Sharp pointed steel bar for removing the clay plug from the tap-hole in a cupola.

TEAR, HOT—Same as crack, hot, but developing before the casting has solidified completely.

TELLURIUM—One of the elements whose chemical symbol is Te. Its formula weight is 127.61; specific gravity 6.24; melting point 452 C.

TEMPER CARBON—Carbon in nodular form, characteristic of malleable iron.

TEMPERING (DRAWING)—Reheating ferrous alloys, after hardening, to some temperature below the critical range, followed by any desired rate of cooling.

TEMPLATE—A guide, gage or pattern for checking dimensions or locations.

TENSILE STRENGTH—The greatest load per square inch of original cross-sectional area carried during a tension test.

TEST BAR—Bar cast of a standard shape and size to determine the physical and chemical properties of the metal.

(To Be Concluded)

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THE WHEELS OF INDUSTRY

Activities of foundry GROUPS

Western New York

REGULAR monthly meeting of the Western New York Chapter of the AFA, held April 5 at the Hotel Touraine, Buffalo, had 56 members and guests in attendance. Chapter Chairman Arthur H. Suckow presided.

Ernest R. Starkweather introduced the guest speaker, James H. Lansing, consulting foundry engineer, Malleable Iron Founders' Society, Cleveland, whose subject was "Malleable Iron." Mr. Lansing traced the history and development of malleable iron from the time it was first produced in this country in 1826, by Seth Boyden. He described its many uses during the war, including castings for army trucks, tanks, gun mounts and bomb and ammunition components, as well as the important part this material plays in peacetime in the automotive, railroad, agricultural and electrical equipment fields.

The speaker pointed out that because of its relatively low brinell hardness, in spite of its high ductility and tensile strength, there is no other ferrous material with comparable physical properties which machines so easily. Mr. Lansing illustrated his talk with slides showing typical malleable castings of intricate shapes, as well as photomicrographs of the grain structures. Many malleable foundrymen from the area attended the meeting and took advantage of the speaker's experience, by asking many questions relating to malleable iron.—*Leo A. Merryman, secretary.*

Southern California

ADVENT of warmer days and springtime brought over 100 members and guests to the Apr. 12 meeting of the Southern California Chapter of the AFA, held at the Elk's Club, Los Angeles. Awards for the high-score teams in the two bowling leagues were made, the Kay Brunner Steel Products and Enterprise Iron Works teams taking top honors.

Lawrence D. Pridmore, International Molding Machine Co., Chicago, was guest speaker, and his talk on "Molding and Core Blowing Machines," was most instructive. Mr. Pridmore stressed the importance of selecting the right production machines for the jobs at hand and brought out the desirability of securing the machine manufacturers' best advice in their selections.

He mentioned that manufacturers are shouldering the responsibility of encouraging foundries to purchase only the proper equipment for production work, with due regard to the type of work at hand, regardless of whether it be the less expensive and simple machines, or, in the case of larger castings and greater production runs, of purchasing more complicated designs. The speaker used slides to emphasize his points.—*J. B. Morey, publicity chairman.*

CANTON DISTRICT: Group shown at recent monthly meeting of Canton District Chapter, AFA, includes, left to right, Charles McLaughlin, Karl F. Schmidt, J. M. Emery, Conrad W. Traut, George M. Biggert, C. F. Bunting, John M. Kane (speaker) and Otis D. Clay. (Photo by *Akron Beacon Journal*)

Eastern Canada and Newfoundland

EASTERN Canada and Newfoundland Chapter of the AFA held a Regional Foundry Conference, Apr. 5 and 6, in Ottawa, for the benefit of members of the Ottawa district. G. E. Tait, chapter chairman, welcomed 200 foundrymen, representative of the United States, Ontario and Quebec.

C. S. Gibson, Ontario Mining Association, discussed "Prevention of Silicosis," and outlined the steps being taken to combat this problem in the Ontario mines. Ken Delong, International Nickel Co., New York, gave an instructive talk on the proper method of introducing molten metal into sand molds in production of castings. He emphasized that the fundamental laws of physics must be remembered and applied. Mr. Delong was followed by Joseph Nixon, Whitehead Metal Products, New York, whose subject covered the melting of iron to obtain best results for pouring of castings in the most economical way.

Interesting general discussion followed, covering these subjects and other foundry problems. Discussion leaders were W. L. Bond, Ottawa Car & Aircraft Ltd., E. N. Delahunt, Warden King Ltd., R. Gibson, R. J. Ferguson & Sons, and W. T. Shute, Canadian Car & Foundry Co. Ltd.

On Saturday, Apr. 6, visits were made to local foundries. A large group also made a thorough tour of the Bureau of Mines Research Laboratories, including the foundry, which is equipped with sand molding, centrifugal casting and die casting equipment as well as melting facilities. Equipment for physical testing, microscopic examinations, x-ray examinations and sand testing, were inspected.

Organization committee for the conference included Charles V. Hacker, Lynn MacLeod Engineering Co. Ltd.;

(*Continued on page* 194)

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Whiting vertical skip hoist widely used in small and medium size foundries.

MECHANICAL CHARGING . . .

. . . . saves costly manpower by eliminating most of the charging force needed for hand charging.

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Each type of Whiting Charging Equipment has been developed as the result of experience with actual plant conditions. In planning a charging system, Whiting Engineers consider all phases of charge handling . . . beginning when the gondolas carrying scrap, coke, limestone, and other charge materials enter the yard. From this survey, the installation which will bring greatest operating efficiency is designed and produced.

Whiting has produced mechanical charging systems for over forty years . . . some of them are still in daily operation. Over the years, Whiting's wide range of experience has resulted in constant improvement, and the development of charging equipment to meet every foundry need. Write today for Bulletin FY-101 on Mechanical Charging Equipment.

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PULVERIZERS
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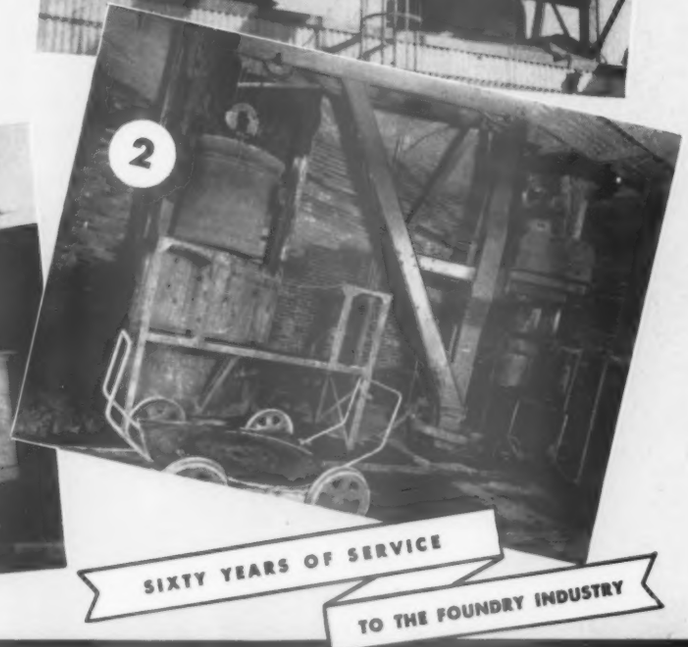
R MELTING COSTS

These illustrations show the wide range of Whiting equipment available to bring the benefits of mechanical charging to the smallest foundry as well as the largest. Whiting has had experience with installations in all types of foundries. It produces equipment ranging from skip hoists serving small cupolas to completely mechanized charging systems, including handling and makeup equipment.

1. Underslung crane type charger for two or more cupolas.
2. Jib crane charger for two cupolas.
3. Monorail charger, wishbone type.



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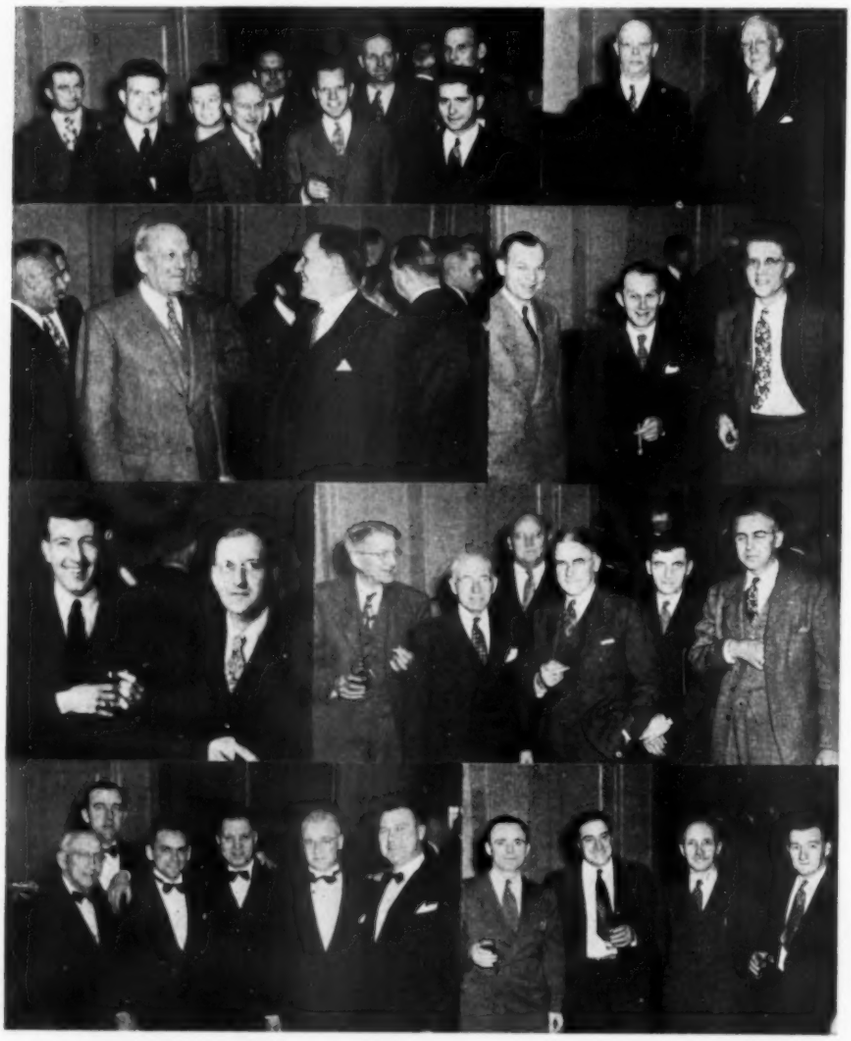
(*Continued from page* 190)

James H. Newman, Chamberlain Engineering Co. Ltd., N. C. MacPhee, Bureau of Mines, I. C. Shepherd, Beach Foundry Ltd., A. E. Cartright, Robert Mitchell Co. Ltd., E. G. Jennings, Dominion Engineering Works Ltd., and A. E. Weedmark, Findlays Ltd.

The regular monthly meeting of the Eastern Canada and Newfoundland Chapter of the AFA was held April 12 in the Salle Doree of the Mount Royal Hotel, Montreal. G. Ewing Tait, chapter chairman, presided

To answer an urgent need of local foundries, particularly small ones, the program committee arranged an exhibition of foundry control instruments and methods for the meeting. The feeling is general that scientific and instrumental control is attainable only by large organizations that can procure equipment for such purposes and have the necessary trained personnel for its successful operation and application. While it is true that maximum usefulness of any piece of equipment depends upon the knowledge and skill put into its operation, it is also true that certain relatively inexpensive instruments can provide valuable information to small foundries, for control purposes, and their operation in many cases does not depend on highly skilled labor.

A. E. Cartwright gave a short talk on the value and utility of control devices in securing highest quality in foundry production. The meeting then adjourned so that members could view the equipment in operation and study its operation and application. All of the apparatus on display was loaned to members by their companies. Consultants directed operation of the equipment and answered questions regarding use and application. Devices for temperature control, hardness tests, quality inspection, identification of metals and alloys and atmosphere testing were on view and in operation.—*G. D. Turnbull, publicity chairman.*



FOUNDRYMEN'S SMOKER: Some of the New England foundrymen who gathered at the Parker House, Boston, at the conclusion of the recent regional conference for the party sponsored by equipment and supplies representatives. Committeemen for the event are shown at left, bottom row. (Photos courtesy A. C. Wyatt, Debevoise-Anderson Co. Inc., Boston)

Detroit

OVER 100 were present for the April 18 dinner and meeting of the Detroit Chapter of the AFA at the Rackham Memorial, technical portion of the evening being given over to three production problems roundtables on the subjects of steel casting, magnesium casting and abrasive cleaning.

Better than 50 attended the steel group meeting to hear Elbert C. Troy, chief metallurgist, Dodge Steel Co., Philadelphia, discuss the comparative merits of opinions versus laboratory tests on properties of core and molding sands used in steel casting operations. A former Detroiter, Mr. Troy held the rapt attention of his audience until well past the usual closing time, and there was a new recognition accorded the value of sound engineering sand tests. The speaker's comments were interrupted frequently by questions of a practical nature from foundrymen present. Ernest Lancashire, Detroit Steel Casting Co., presided.

Causes and control of microporosity in magnesium sand castings were reviewed by M. E. Brooks, foundry engineer, magnesium division, Dow Chemical Co., a former director of the Detroit Chapter and now an executive officer of the Saginaw Valley Chapter. Mr. Brooks had prepared a lengthy paper on this subject for presentation before the AFA nationally, and took this opportunity to abstract it briefly for discussion by light metal experts in the Detroit area. A. W. Stolzenburg, Aluminum Co. of America, was chairman of this group meeting.

First roundtable discussion ever arranged by the chapter on the subject of abrasive cleaning featured an interesting commentary by A. L. Gardner, Pangborn Corp., Hagerstown, Md., with C. A. Bultman, Detroit district manager of Pangborn, introducing the speaker and directing the discussion. By means of a series of unusual slides, the progress of abrasive cleaning was traced from its inception to the present time, with examples cited of how demands of the automotive industry for clean castings in large quantity had spurred the development of automatic equipment for the work.

Mr. Gardner supplemented his review by two moving pictures, one showing the airless grit blasting of cylinder blocks at the Buick foundry, the other depicting the cleaning of large castings by high pressure water at the Trafford, Pa., works of Westinghouse.

Nominations for chapter officers for

(*Continued on page* 197)

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A "blend" of Jisco Silvery with your gray iron, steel and other melting stock produces a sound metallurgical product. It can be used to adjust the silicon content of the heat depending upon the type of scrap available and the required physical properties of the castings.

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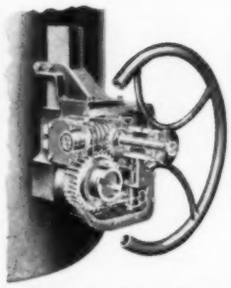

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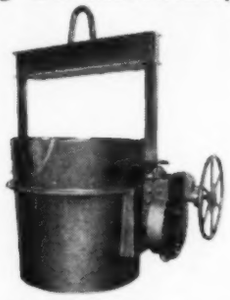
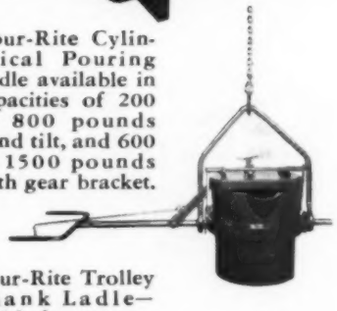


All-Welded Whiting Pour-Rite Crane Ladle, equipped with gear bracket and anti-friction bearings.

Pour-Rite Cylindrical Pouring Ladle available in capacities of 200 to 800 pounds hand tilt, and 600 to 1500 pounds with gear bracket.



Pour-Rite Trolley Shank Ladle—welded construction with a permanently non-binding shielded cover. 200 to 1500 pound capacities.

Pour-Rite Ladle Handler available in capacities up to 2000 pounds.

(*Continued from page* 194)

1946-47 were presented by R. G. McElwee, Vanadium Corp. of America, chairman of the nominating committee. They are: Chairman, A. H. Allen, Detroit editor, THE FOUNDRY; vice chairman, C. E. Silver, Michigan Steel Casting Co.; secretary, R. E. Cleland, Eastern Clay Products Co.; treasurer, W. W. Bowring, Frederic B. Stevens Inc., and four new directors—Pierce Boutin, Pontiac Motor Division; E. J. Burke, Hanna Furnace Corp.; R. L. Orth, American Foundry Equipment Co., and W. N. Seese, J. S. McCormick Co. Election will be held at the May 16 meeting of the chapter.—*A. H. Allen, vice chairman.*

Pittsburgh

APRIL meeting of the Pittsburgh Foundrymen's Association had A. J. Edgar, technical advisor of the Gray Iron Founders' Society, Washington, as principal speaker. His talk on "Correction of Foundry Waste" discussed the various phases of ferrous foundry operations where waste is most likely to occur, including melting, coremaking, molding, shakeout and cleaning.

Discussing melting practice, Mr. Edgar pointed out the necessity of selecting accurate size and weights of materials making up the cupola charge and proper height of the cupola coke bed. Well controlled cupola operation will aid in saving gray iron foundries many hundreds of dollars each year, he declared. Similar accurate measurements of materials are necessary in coremaking. In connection with gating, he stated that gates should be arranged to meet the following requirements:

1. They must not erode sand or trap air.

2. They must not cause hot spots or shrinkage cavities.

3. They must be as easily removed as possible in cleaning.

Mr. Edgar also emphasized the importance of proper supervision in the foundry, together with sound instruction of workers in practices which will accomplish the desired results with minimum of waste.

Western Michigan

MEETING of the Western Michigan Chapter of the AFA, held April 11 at the Fountain Street Baptist Church, Grand Rapids, Mich., was designed to attract young men to the foundry industry and to acquaint members, guests and prospects with the benefits and assistance available through the chapter's Donald J. Campbell Educational Fund in financing a foundry course in one of the Michigan schools. An invitation extended to school superintendents, high school principals, manual art teachers and prospective students in the area, brought 125 members and guests to the meeting.

J. Wesley Lee, chapter chairman, presided at the dinner meeting, following which George Myer introduced C. J. Freund, dean of the engineering school, Detroit University. In his talk entitled "The Future of the Foundry for a Young Man," Mr. Freund brought out that the foundry has more relative opportunities than any other industry, that vast amounts of research are yet to be done, and that prosperity will follow research. He stated that the foundry industry has not yet reached its peak and research will bring this about. He also stressed the point that if young men take advantage of all the technical training available at school, and are willing to learn from the man in the shop, they will find their futures in the foundry industry.

J. L. Brooks then introduced Ralph L. Lee, member of the employees' co-operation staff, General Motors Corp., Detroit, whose subject was "Romance in the Foundry." Mr. Lee explained in detail the steps necessary in the production of a casting, describing how these steps are applied in his hobby foundry. He stated that every step taken by the foundry to make a casting is of special interest in itself and proved that the foundry is a desirable place in which to work.—*R. W. Hathaway.*

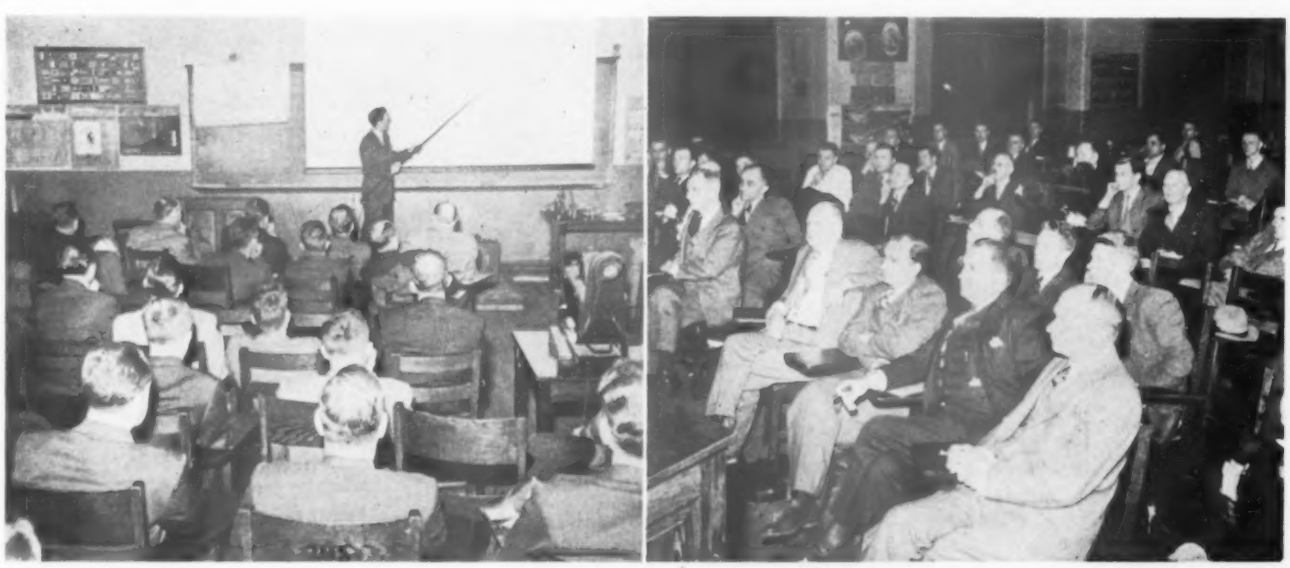
Philadelphia

MEMBERS of the Philadelphia Chapter of the AFA turned out in large numbers at the April 12 meeting, held at the Engineers' Club, to hear Clyde L. Frear, senior materials engineer, Bureau of Ships, U. S. Navy, Washington, who discussed "Casting Defects and Their Remedies." Fred G. Sefing, research metallurgist, International Nickel Co., New York, acted as technical chairman.

Mr. Frear's subject has an unlimited field, and he handled it well. Beginning his talk by the use of radiographs to illustrate the types of defects he would cover, he then discussed the possible remedies for such defects.

Report of the nominating committee, headed by Robert Latham, Bethlehem Steel Co., proposed the following officers for 1946-47: Chairman, B. A. Miller, Cramp Brass & Iron Foundries Division of Baldwin Locomotive Works, Eddy-

(*Continued on page* 199)



LECTURE COURSE: Scenes during the elementary foundry course sponsored by Philadelphia Chapter, AFA, in co-operation with the University of Pennsylvania. At its conclusion certificates were presented to those who attended 80 per cent of the lectures. Held each Monday evening for 18 weeks, the course covered a wide range of foundry subjects

BETTER PATTERN SHOP EQUIPMENT

MANY OUTSTANDING FEATURES

- 32" Throat Clearance
- 24" Vertical Adjustment of Table
- 8" Travel of Spindle
- 30" Longitudinal Travel of Table
- 16" Transverse Travel of Table
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- Available in Hand or Power Feed Table
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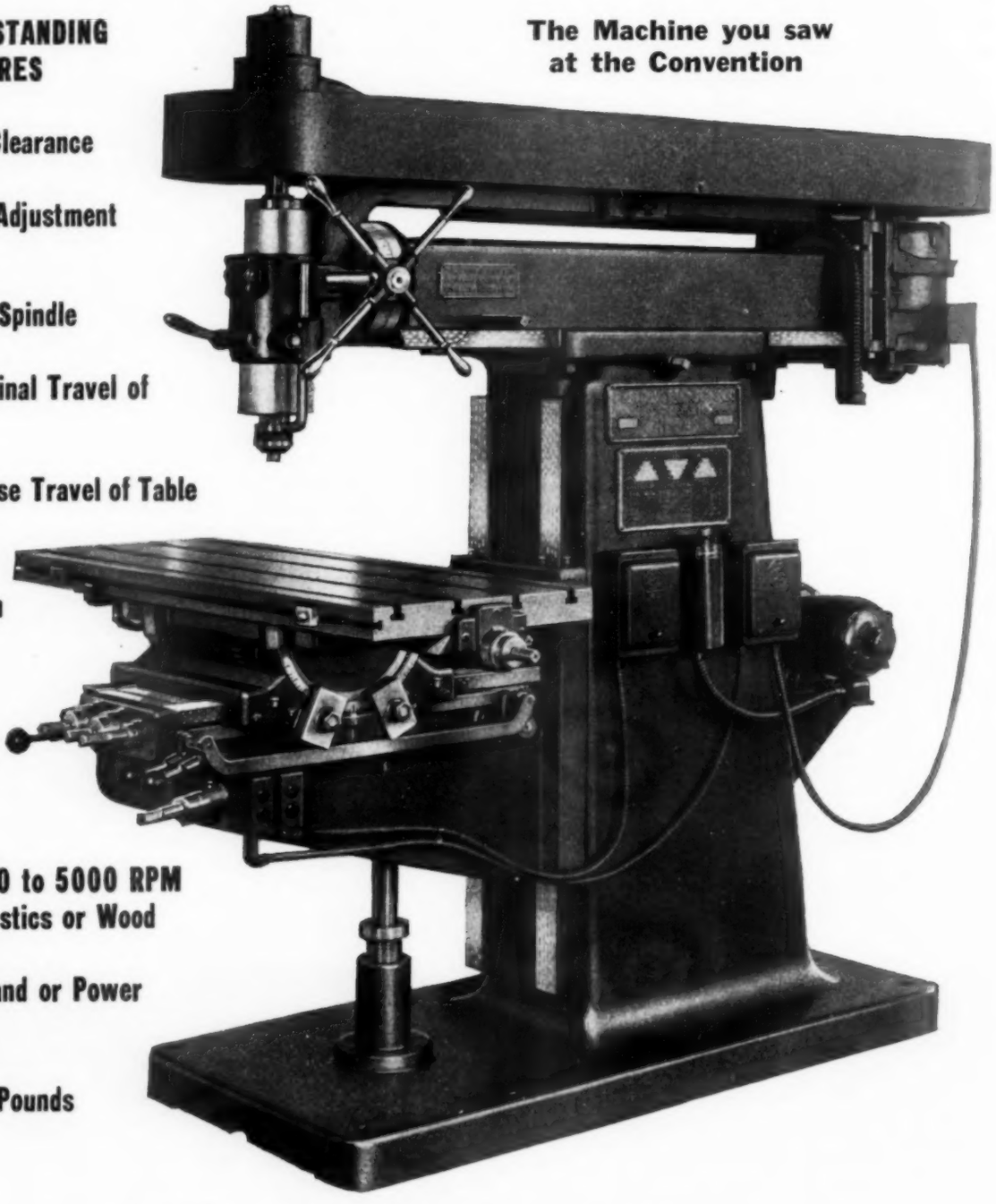

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Pattern Shop & Foundry Supplies & Equipment

Mahogany and Pine Pattern Lumber

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(*Continued from page* 197)

stone, Pa.; vice chairman, E. C. Troy, Dodge Steel Co.; secretary-treasurer, W. B. Coleman, W. B. Coleman Co. Nominations for directors include: William Morley, Olney Foundry Division, Link-Belt Co., and A. C. Gocher, Fletcher Works Inc.—*E. C. Troy.*

St. Louis

REGULAR monthly meeting of the St. Louis District Chapter of the AFA was held April 11, with 92 members and guests in attendance. Walter Zeis, chairman of the membership committee, reported a paid-up membership of 235, compared with 228 members a year ago. Jack Kelin, chairman of the entertainment committee, reported inability to secure food and refreshments for the annual picnic of the chapter. Chairman W. E. Illig then announced the decision of the board of directors to eliminate the picnic in 1946 due to these uncertain conditions.

Col. Carter Bliss, recently returned to St. Louis after four years of service overseas, gave an interesting review of his experiences with the First Army, especially on D-Day invasion and the Battle of the Bulge, with highlights of other battles and the subsequent transfer of his unit to Okinawa and Japan.

E. E. Ballard introduced Bruce Simpson, president, National Engineering Co., Chicago, whose subject was "History and Development of the Foundry Industry." Mr. Simpson, assisted by Mrs. Simpson, gave an interesting talk with slide illustrations, beginning with the discovery of metals and ancient methods of melting and molding practices in various countries and the progress made up to 1896.

Luther Kleber submitted the nominating committee's selection of the following slate of officers and directors to serve during 1946-47: Chairman, Roland T. Leisk, American Steel Foundries, East St. Louis, Ill.; vice chairman, Norman Peukert, Carondelet Foundry Co.; secretary, Robert Wood, Warren Coke Co.; treasurer, Harold Weise, manufacturer's agent; directors, Walter Illig, vice president, Banner Iron Works; Charles Rothweiler, Hickman, Wiiliams & Co.; Lee H. Horneyer, manufacturer's agent; and John Holtman, American Manganese Steel Co. It was unanimously voted that the nominees be elected.—*Lee H. Horneyer, secretary-treasurer.*

Connecticut

CONNECTICUT Nonferrous Foundrymen's Association held its regular monthly meeting April 17, at Hotel Taft, New Haven, Conn., with "Sand" as the technical subject of the meeting.

A film sponsored by the Whitehead Bros. Co., Providence, R. I., was shown and the question period following was directed by William R. Slater of that company. Discussion touched on the relative value of synthetic sands and natural sands for jobbing and production foundries, as well as various types of sand testing equipment.

In production foundries sand testing equipment is used as a check on sand conditions and its physical properties. In jobbing foundries mechanical sand testing equipment cannot be used as efficiently due to the molding skill required and because of the expense involved. Use of synthetic sand in the jobbing foundry is limited by the lack of proper sand handling equipment.—*Louis G. Tarantino, secretary.*

Birmingham District

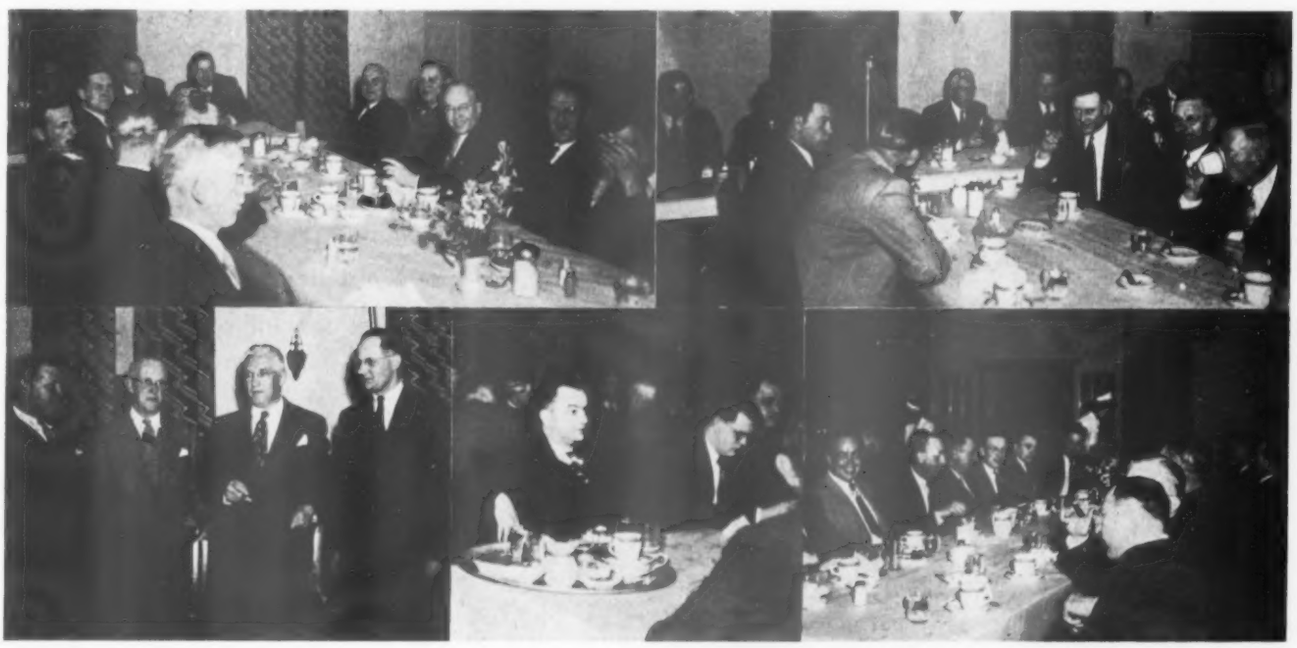
APPROXIMATELY one hundred members and guests attended the March meeting of the Birmingham District Chapter of the AFA and heard Ed H. King, vice president and general manager, the Hill & Griffith Co., Cincinnati, ably assisted by Joe Schumacher, chief engineer of the same company, discuss the all-important subject "Mechanization in the Foundry." Mr. King's paper was amply supplemented by numerous slides.

Mr. King stated that the entire foundry industry faces the problem of aggressive competition from other fields and that the average production foundry must mechanize if it expects to be competitive and survive.

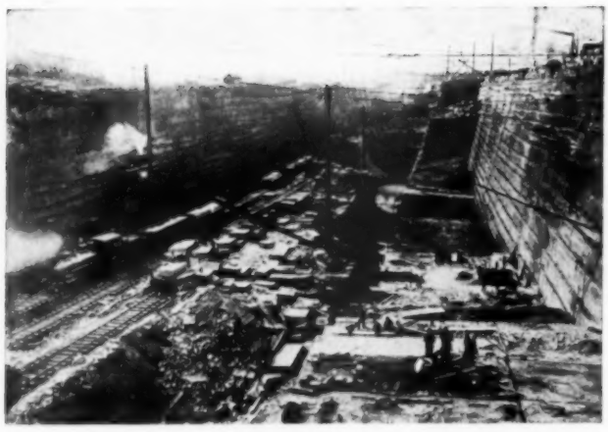
Mechanization will enable the small shop to reach out into new fields because mechanization increases efficiency. Mechanization does decrease flexibility somewhat, but with proper planning the optimum requirements of any particular shop can be engineered. Mr. King stressed the feasibility of undertaking a mechanization program in steps so that the costs may be paid out of profits resulting from increased efficiency. It was pointed out that it is good business to invest in new and better equipment.

Sand handling in all its various phases was discussed in detail, covering screening, sand cutting, sand preparation, as well as core oven design and casting shakeout. Numerous practical modern plant layouts were cited. The importance

(*Continued on page* 201)



SAGINAW VALLEY: Dinner scenes at recent regular meeting of Saginaw Valley Chapter, AFA, at Frankenmuth, Mich.



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(*Continued from page* 199)
of the removal of fines was emphasized.

J. A. Bowers, program chairman, introduced the speakers, and presided over a lively question-and-answer session which followed the talks.

An unusual feature at the dinner preceding the technical session was the presentation of Joe Travis as the coffee speaker. His subject was "This and That," a humorous takeoff in the main on members of the local chapter. In addition to this talk Mr. Travis amazed the audience with his ability to manipulate from midget to elephant size harmonicas, the smallest of which was thought to have been swallowed on many occasions.

J. Arthur Woody, chairman of the chapter, presided over the meeting. Mr. Woody reported many fine expressions of gratitude for the fine District Conference which was promoted by the chapter in February.—*J. P. McClendon, publicity director.*

Ernest Lancashire (left), chief metallurgist, Detroit Steel Casting Co., introduces Elbert C. Troy, chief metallurgist, Dodge Steel Co., Philadelphia, to direct the steel group roundtable discussion at the April meeting of the Detroit Chapter, AFA

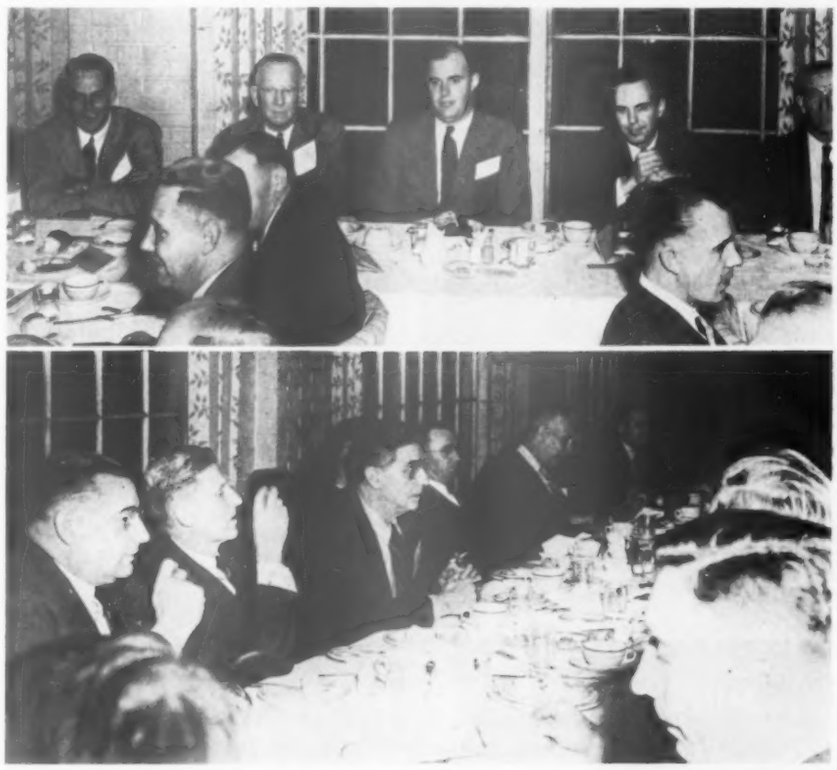
Central Illinois

CHAIRMAN Ed Roby presided at the Apr. 15 meeting of the Central Illinois Chapter of the AFA, at the Jefferson Hotel, Peoria. He welcomed the 140 members and guests and introduced M. J. Gregory, a former national director of the AFA, and R. E. Wilke of Deere & Co., Moline, Ill. F. W. Shipley, program chairman, announced that the annual picnic will be held June 8 at Shore Acres Country Club, Chillicothe, Ill.

Mr. Roby introduced the guest speaker, Hyman Bornstein director of testing and research laboratories, Deere & Co., whose subject was "Selecting the Correct Material for the Job." He stated that in most cases there is a choice of materials and methods of fabrication, and the correct material will produce satisfactory results and services at low cost. A change in material might be necessitated by service failure, a new design, or for the purpose of reducing cost of production. Mr. Bornstein recommended study of the service failure, because we learn more from failures than from successes, and frequently a slight change in design to overcome field failures may be accomplished without cost increases. He then gave actual instances to illustrate his point. New designs are frequently based on old ones, where similar material is used for a casting or forging, and the advice of the stress engineer and metallurgist should be secured on completely new designs. He pointed out that advances in stress analysis have made it possible to obtain information not possible in the past.

The speaker stated that the problem of cost reduction is always present, and availability of new materials and new methods influences this. The main objective is to produce a satisfactory machine at the lowest cost. He then described the many properties of gray iron castings, effects of different alloys and cost of cast iron. In discussing white and chilled iron castings used for wear resistance he said that it is necessary to redesign a casting when going from gray iron to a chilled casting. Malleable castings were mentioned as having good casting properties, ductility, machinability and impact resistance. Steel castings, forgings, stampings, weldments, brazed parts and plastics also were described in detail with regard to properties, uses, methods of manufacture, costs, etc.

In conclusion, Mr. Bornstein stated that most designs are a result of experience and that changes in methods and materials make it desirable to examine a design critically at frequent intervals in order to



TWIN CITY: Speakers' table and part of the audience at March meeting of the Twin City Chapter, AFA, addressed by Frank Ross, E. F. Houghton Co., Philadelphia. Chapter Chairman R. C. Woods shown in top row, center

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base selection of material for the job at the lowest possible cost.

Joseph Kolb, Caterpillar Tractor Co., chairman of the nominating committee, read the following slate of officers and directors for the year 1946-47: Chairman, Z. Madacey, Caterpillar Tractor Co., Peoria; vice chairman, A. V. Martens, Pekin Foundry & Mfg. Co., Pekin; secretary-treasurer, C. W. Wade, Caterpillar Tractor Co. Directors nominated for three years: F. W. Shipley, Caterpillar Tractor Co., and Ed Roby, Peoria Malleable Castings Co. Directors for two years: Charles Buckler, Superior Foundry, Peoria, and V. W. A'Hearn, Midwest Pattern Works, Peoria. Directors for one year: Adolph Klawitter, Peoria Foundry Division, M. H. Deterick Co. and Prof. C. E. Schubert, University of Illinois. —*C. W. Wade, secretary.*

Central Indiana

ANNUAL double-header meeting of the Central Indiana Chapter of the AFA was held Apr. 1, at the Athenaeum in Indianapolis. Once each year the membership divides into two groups, ferrous and nonferrous. On this occasion the ferrous group thoroughly enjoyed the presentation by A. S. Klopf, senior engineer, Lester B. Knight & Associates, Chicago, whose subject was "Casting Defects in Gray Iron."

Mr. Klopf has served the gray iron industry for a long time as teacher, plant metallurgist, executive and consultant, and has an unusually good background for discussion of his subject. He is a member of the Committee on Foundry Defects of the AFA, and reviewed the principal casting defects encountered, illustrating his talk with slides and discussion. He pointed out that defects must first be classified. Then it must be determined which section of the foundry is responsible for them. Finally, corrective measures must be applied. R. C. Robertson, chief foundry inspector, International Harvester Co., Indianapolis, served as technical chairman.

The nonferrous group was addressed by A. K. Higgins, superintendent, research department, Allis-Chalmers Mfg. Co., Milwaukee, who discussed "The Correlation of Metallurgical and Foundry Properties of Nonferrous Alloys." Mr. Higgins' entire career has been spent in nonferrous metallurgy, through production, development, control and research, and his concise presentation demonstrated his thorough knowledge of the subject. Driving home his points, one by one, with slides, diagrams and discussion, he clearly showed the effect of oxidizing atmospheres at different stages of melting, simultaneously referring to types of fuel and equipment employed.

(*Continued on page* 204)

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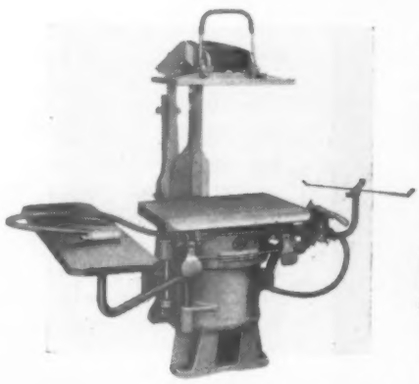

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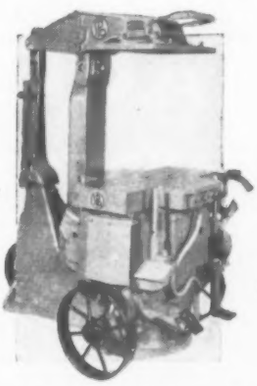

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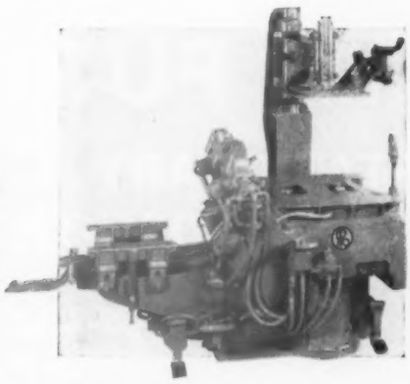

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(*Continued from page 202*)

The effect upon the structure of the metal under oxidized and deoxidized conditions was traced and defined. Fred Carl, metallurgist, Delco-Remy Corp., Anderson, Ind., served as technical chairman.—*B. P. Mulcahy, historian.*

Northeastern Ohio

THE subject of patterns attracted one of the season's largest attendances to the March 14, meeting of Northeastern Ohio Chapter of the AFA, more than 200 gathering at the Cleveland Club for the event. The program was sponsored by the Pattern Manufacturers' Group of the Associated Industries of Cleveland, and had as its chairman Frank C. Cech, Cleveland Trade School, and chairman of the Patternmaking Division of the AFA.

Two talks were presented, the first by Ed Pierie, general foreman of the wood patternshop, Motor Patterns Co., Cleveland. Mr. Pierie showed a number of large-scale drawings to illustrate his discussion of methods for casting a piston for an internal combustion engine and a gate valve.

Vincent J. Sedlon, president, Master Pattern Co., Cleveland, and program chairman of the AFA Patternmaking Division, was the second speaker. His talk covered various factors that should be considered in the selection of patterns and pattern equipment, including price, moldability and production methods.

Apr. 11 meeting of the Northeastern Ohio Chapter was the annual past presidents' night, and eight of the ten were present, including Walton L. Woody, Frank G. Steinebach, Bert G. Parker, L. P. Robinson, F. Ray Fleig, J. H. Tressler, James G. Goldie, and Russell F. Lincoln. E. F. Hess and Frank J. Dost were unable to be at the meeting.

President A. C. Denison called on Mr. Lincoln, chairman of the nominating committee, for a report and he stated that the following officers and directors had been nominated for 1946-47: President, Henry J. Trenkamp, Ohio Foundry Co.; vice president, Bruce Aiken, Crucible Steel Casting Co.; treasurer, F. Ray Fleig, Smith Facing & Supply Co., and secretary, Gilbert J. Nock, Nock Fire Brick Co. Directors for three years include Vincent Sedlon, Master Pattern Co.; Walter E. Sicha, Aluminum Co. of America; C. S. Winter, Duplex Mfg. & Foundry Co., Elyria; Fred J. Pfarr, Lake City Malleable Co., and W. G. Gude, THE FOUNDRY.

Technical speaker at the meeting was Dr. Paul F. Collins, Austenal Laboratories Inc., Chicago, who discussed precision castings. He pointed out that the precision casting process does not

(*Continued on page 206*)

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ALLOY STEEL BILLETS

ALLOY STEEL CASTINGS

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(*Continued from page* 204)

encroach on other methods of casting since it generally applies to small castings under 1 lb in weight which are not readily machinable or which must be held to close dimensional tolerances, possess extremely smooth surfaces, are thin in section, or are intricate in conformation. While cost of castings may appear somewhat high, the costs often are comparable and sometimes cheaper than those made by ordinary methods when machining and other finishing costs are added.

Mr. Collins described the procedure which involves accurate dies or molds for making the wax patterns. The individual wax patterns, usually grouped together with wax runners and gates, are sprayed with a silica compound which is allowed to dry. Then the coated pattern is placed in the flask and the semi-liquid backing material composed of coarse silica is poured around it. The mold is vibrated to insure good packing. The mold then is dried and finally raised to a temperature of 2000 F to remove all traces of wax or carbonaceous material. Molds are removed from the furnace, attached to the top of the furnace containing the molten metal. The furnace of the rotary type, is rolled over to permit the metal to flow into the mold, and often a slight pressure is applied to provide increased head of flow. —*Edwin Bremer.*

Central New York

ANNUAL nonferrous meeting of the Central New York Chapter of the AFA was held April 12 at the Onondaga Hotel, Syracuse. Vice Chairman E. E. Hook presided and introduced the guest speaker, Anthony Cristello, foundry manager, Eclipse Pioneer Division, Bendix Aviation Corp., Teterboro, N. J., who discussed "Comparative Foundry Characteristics of Bronze and Aluminum Alloys."

Mr. Cristello has had over twenty years of practical nonferrous experience and is well able to discuss the practices necessary for production of castings of copper and aluminum alloys. He stressed proper gating and risering, giving several definite ratios of sprues, runners and gates. He was quick to admit that in many cases several foundrymen may gate and riser a particular job in their own way and each may produce sound castings. However, for good, economical operation, a definite system should be used.

The speaker used time as one measure for good gating. All pouring operations should be timed and checked in pounds per second. By comparing results of these time checks it is possible to arrive at a rate of metal flow that produces sound

(*Continued on page* 208)

Wherever you go, you hear **MORE FOUNDRYMEN** talking of using **MORE ALUMINUM** for **MORE THINGS.** Why?

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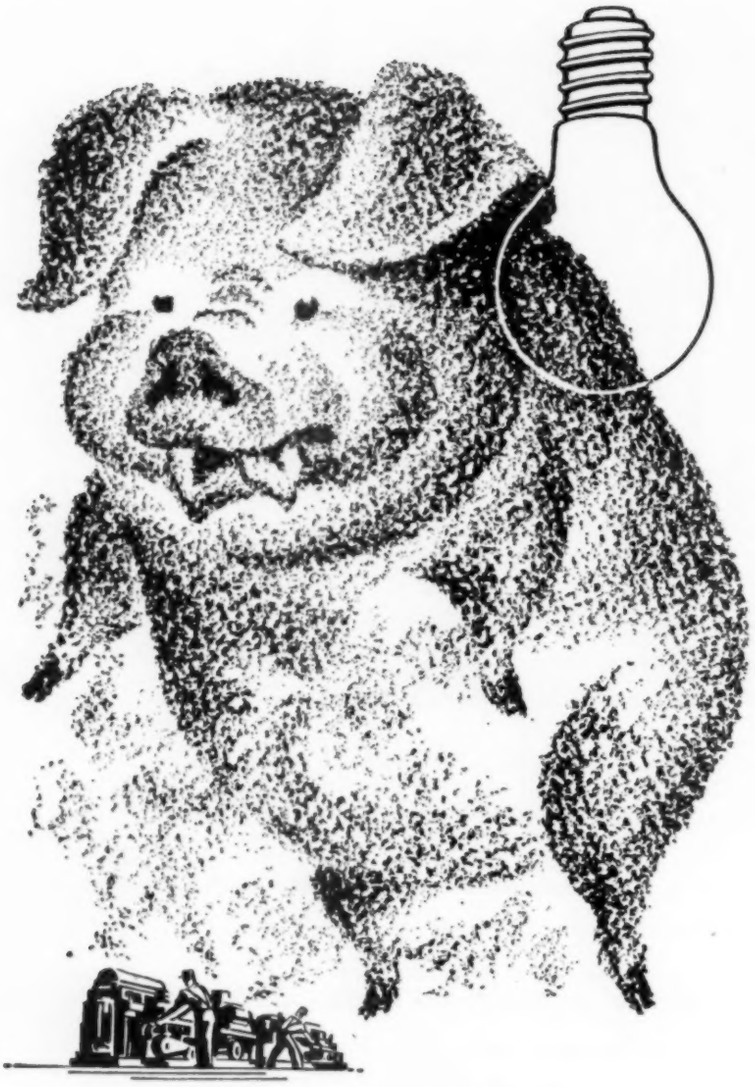

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(*Continued from page* 206)

castings, and runners and gates may be altered accordingly. He also discussed at length the selection of proper grades of sand, both for cores and molds, covering grain size, moisture, etc., as well as binders and oils for cores, and proper melting and pouring technique.

A lively discussion period followed Mr. Cristello's talk and many interesting problems were presented for his suggestions and advice.—*John A. Feola, reporter.*

Northern California

REGULAR monthly meeting of the Northern California Chapter of the AFA was held April 12, at the Engineers' Club, San Francisco. President Charles Hoehn Jr. presided. After the fellowship hour, dinner was enjoyed by 68 members and guests, during which time members and guests took part in community singing, with Pete Valentine, sales manager, Del Monte Sand Co., strumming his famous guitar, and Jay Snyder, Joseph Musto Sons-Keenan Co., a talented new member, officiating at the piano. As a surprise entertainment feature, Pete Valentine presented Edward LeRoy, who did impersonations from records, receiving enthusiastic applause.

Introduction of guests revealed that 17 members of the industry, or friends of the chapter, were in attendance, including Pete Valentine Jr.; Harold Riskas, foreman, American Radiator & Sanitary Corp., Richmond, Calif.; Clyde Gandy, Columbia Steel Co., Pittsburg; Lewis D. Nichols, Mare Island Navy Yard foundry; and F. A. Wahlheim, Bruce C. Farnow and L. A. Blum of Federated Metals Division, American Smelting & Refining Co., San Francisco.

Program Chairman A. M. Ondreyco, Vulcan Iron Foundry, then introduced John Selfridge, assistant superintendent, and Louis D. Alpert, superintendent, Federated Metals Division, San Francisco. Mr. Selfridge, who has been associated with the company since his graduation from University of California, in 1940, addressed the group on "Metallurgy of Brass and Bronze." In a comprehensive manner he covered melting, fluxing and alloying of nonferrous metals, describing the several types of furnaces used, such as pit, crucible, open flame, arc-type and induction-type electric. Fuels common to the west coast area were mentioned, including natural gas, several types of oil, and electrical energy. It was pointed out that in combustion types of furnaces, a slightly oxidizing condition is the more desirable, and the subject of relationship of various gases to metal quality was covered.

The speaker stated that fluxes to form

(*Continued on page* 212)

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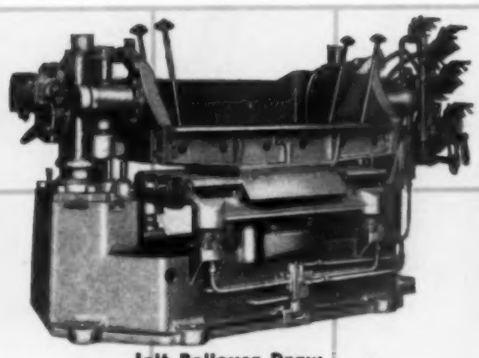
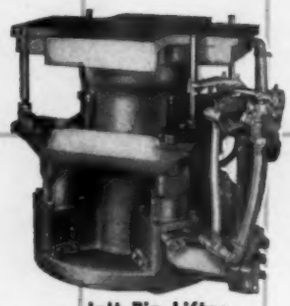
Cleveland Foundry Show

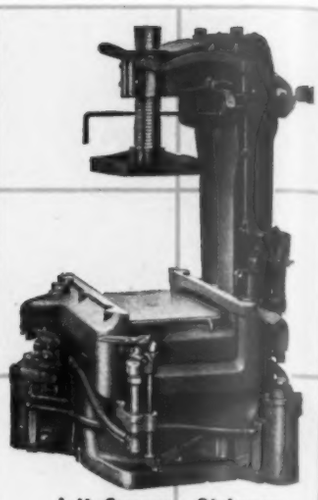
JANUARY FEBRUARY MARCH APRIL MAY JUNE JULY AUGUST



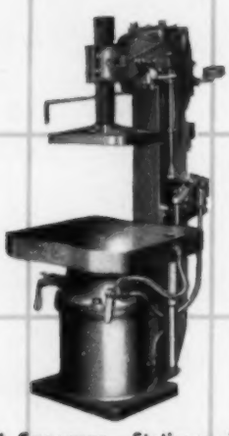
Jolt Rollover Draw
Available in 6 sizes



Jolt Pin Lifter
Available in 6 sizes

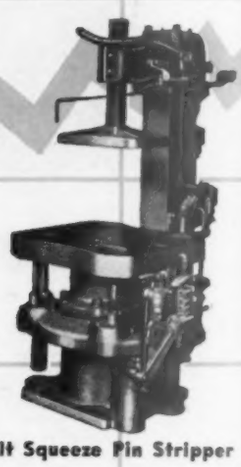


Jolt Squeeze Stripper
Arm Type

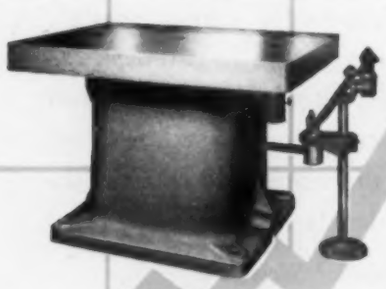


Jolt Squeezer—Stationary Type
14" and 16" Piston Sizes

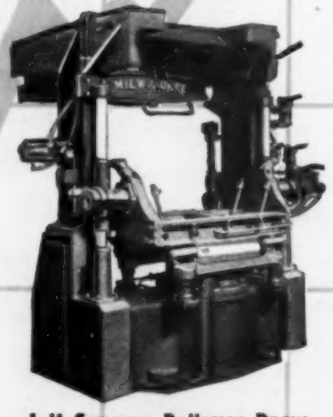
Jolt Squeezer—Portable Type
10" and 12" Piston Sizes



Jolt Squeeze Pin Stripper



Plain Jolt
Made in All Sizes



Jolt Squeeze Rollover Draw

Core Grinder

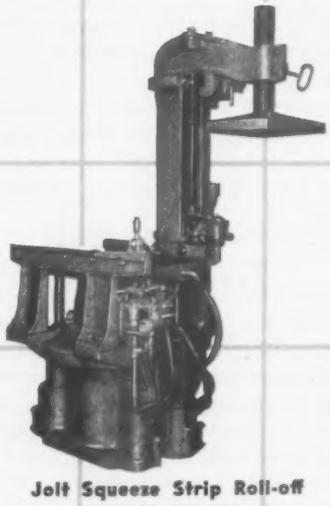
MILWAUKEE

MANUFACTURERS OF MOLDING MACHINES AND BRIQUETTING PRESSES

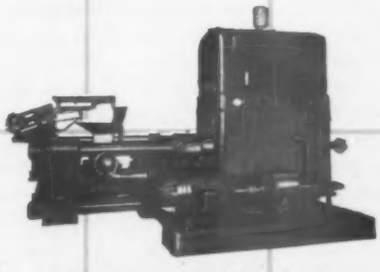
HAILS MILWAUKEE MOLDERS

OCTOBER NOVEMBER DECEMBER

Jolt Squeeze Stripper
Car Type



Jolt Squeeze Strip Roll-off
Available in 6 sizes



Hydraulic Briquetting Press

Thousands of Foundrymen Inspected the New, Improved Milwaukee Molding Machine that Steps Up Mold Production—Takes Heavy Lifting Away From Operator

Again Milwaukee "stole the show"! Foundrymen attending the Cleveland Convention were favorably impressed with the new Milwaukee Molder designed to modernize molding methods, save lifting and speed up production.

Now that the show is over, and you're back on the job, why not give YOUR molders the "once over"? Are your machines modern? Do they give you the mold production you have a right to expect? Will they enable you to meet competition? If not, we suggest you write for literature describing the new Milwaukee line of Molders.

In this complete line, there's a model to meet every molding requirement. And every machine is designed and built to take hard, everyday punishment. Steel castings and alloy steels are used where stress is applied. Close-grained, high tensile grey iron is used wherever wear occurs. Instead of links and levers, rigid integral members are employed for alignment. Hardened pins and bushings serve as guides. Correct lubrication is provided. All parts are accurately machined to close tolerances. Adjustments are very accessible and easy to make.

Call in a MILWAUKEE Foundry Engineer

Every engineer at Milwaukee Foundry Equipment Co. is a practical, seasoned foundryman, familiar with all phases of the industry (pattern making, foundry engineering, foundry operation, etc.) This broad experience enables him to study your molding and core making problems intelligently, and arrive at a solution that is both practical and economical.

Foundry Equipment Co.

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"FALLS BRAND" ALLOYS

"FALLS" NO. 11 ALLOY
makes
High Electrical Conductivity
Copper Castings

The manufacturing of high electrical conductivity castings is no longer restricted to a highly specialized group of foundries.

It is now open to all foundries. There are no secret arts or formulae.

"FALLS" NO. 11 ALLOY:

. . . degasifies and deoxidizes the copper.

. . . protects the molten copper from reoxidation up to and during the pouring operation.

Insuring—

DENSITY, SOLIDITY, and HIGH ELECTRICAL CONDUCTIVITY CASTINGS.

Write for complete details

NIAGARA FALLS
Smelting & Refining Corporation
AMERICA'S LARGEST PRODUCERS OF ALLOYS
BUFFALO 17, NEW YORK

(*Continued from page* 208)

a protective covering over the molten metal play an important role. Charcoal is not desirable for this purpose. Sorting of scrap metal for proper segregation is an operation which requires the highest skill. He mentioned that there are seven groups of alloys, many of which have been developed for special purposes. There are really too many types and a simplification program would benefit the industry. Mr. Selfridge described in some detail the principal alloys in general use.

Mr. Alpert then took over as round-table discussion leader. A graduate of Massachusetts Institute of Technology in 1933, he has spent practically a lifetime with Federated Metals Division, at various plants, the last four years at San Francisco. A lively discussion period followed. Much of the interest centered on gassing and its remedies. Scientific opinions were contributed by metallurgists present. The practical foundrymen presented their viewpoints and brought up many interesting questions. Some of the subjects covered included pouring temperatures, moisture, de-oxidants, fluxes, atomic hydrogen, carbon, resistance of various alloys to gassing fluidity, contamination, resistance to salt water and other types of corrosion.

The program was intensely interesting and Mr. Selfridge and Mr. Alpert were applauded generously at the close of the meeting.—*Charles R. Marshall, publicity chairman.*

Twin City

AT the Mar. 19 meeting of the Twin City Chapter of the AFA, held at Curtis Hotel, Minneapolis, Frank Ross developed a different phase of foundry operation in his talk entitled "Lubrication and Maintenance Problems in a Foundry." Selection of the proper lubricant and its correct application will eliminate the majority of foundry maintenance problems, he pointed out.

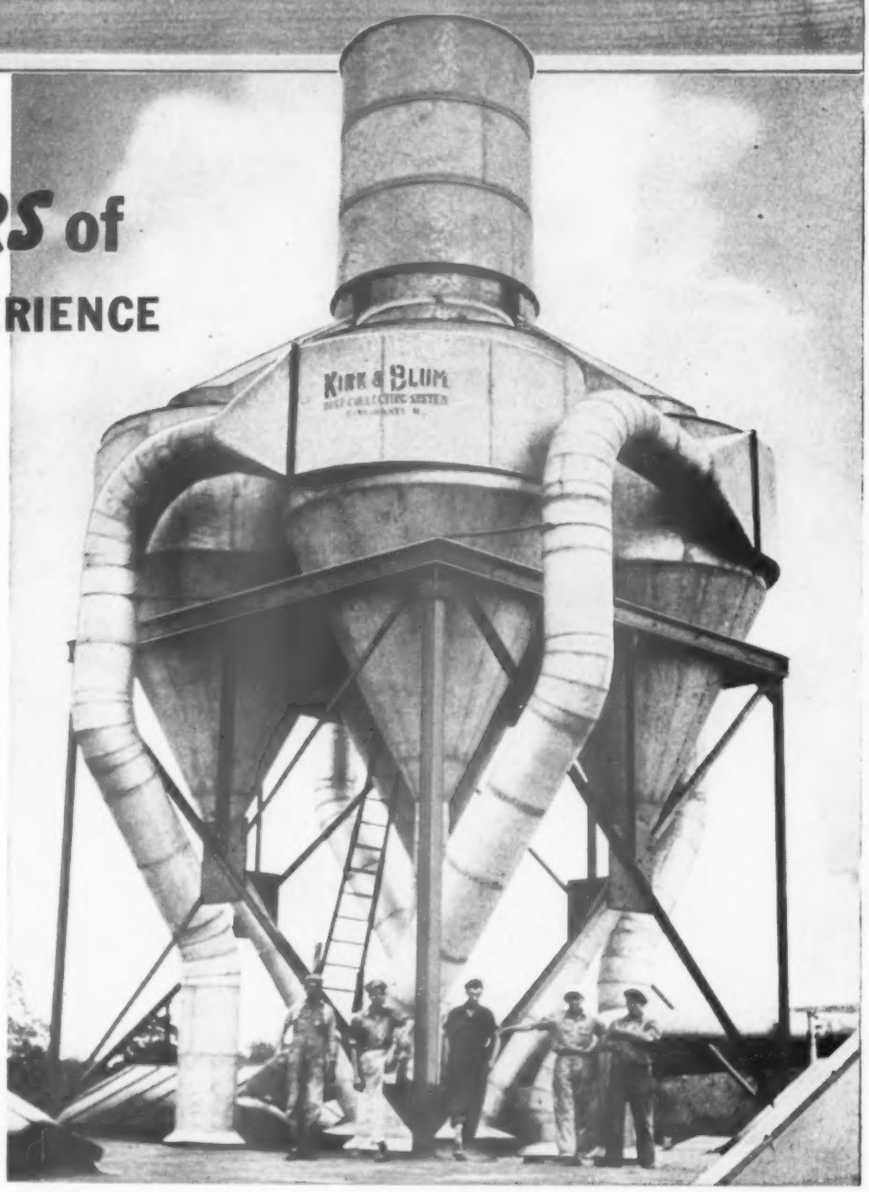
Mr. Ross, who is lubrication manager, E. F. Houghton Co., explained the relationship of lubrication to various types of bearings and methods of lubricating each type. He also discussed greases that are available for foundry use. In order to provide properly for adequate lubrication it was suggested that a reputable oil supplier be selected to take responsibility for plant lubrication, make a survey of the plant and recommend suitable lubricant for each unit and submit a schedule showing method and frequency of lubrication necessary.

Clifford Anderson, chairman of the nominating committee, assisted by A. M. Fulton and I. F. Cheney submitted names of the following to act as officers and

(*Continued on page* 214)

ENGINEERED DUST CONTROL

BACKED BY *39 YEARS* of SPECIALIZED EXPERIENCE



In back of every Kirk and Blum Dust Control System is the accumulated engineering knowledge and skill derived from 39 years of specialized experience.

Every Kirk and Blum system is carefully designed and custom-built to meet the needs of the job and is adequately powered to remove all harmful dust from the various machine operations.

Play safe when you are considering a substantial long-term investment like dust control. Get all the facts before making a decision.

For complete details on the service rendered by Kirk and Blum engineers, write to The Kirk & Blum Manufacturing Co., 2808 Spring Grove Ave., Cincinnati 25, Ohio.

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- Fan Systems for Various Industries
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- Industrial Ovens
- Cooling Systems for the Glass Industry
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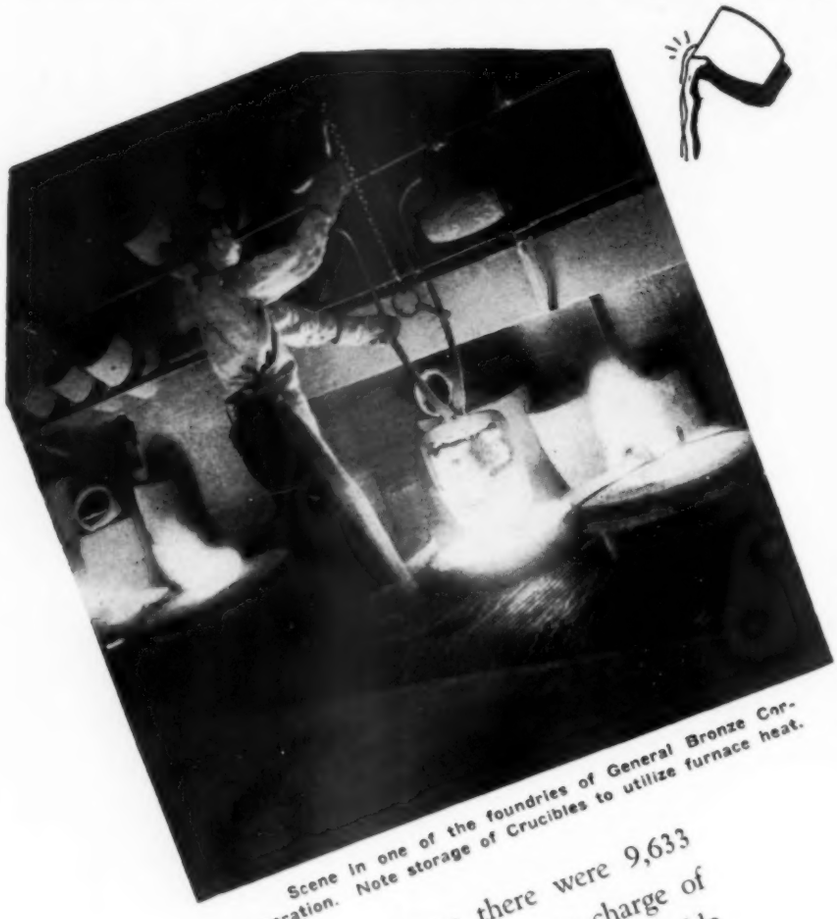
THE KIRK & BLUM MFG. CO.

AN ORGANIZATION OF ENGINEERS and MECHANICS

GROWTH! 85% plus in 5 years in Crucibles for Non-ferrous Melting



Scene in one of the foundries of General Bronze Corporation. Note storage of Crucibles to utilize furnace heat.

In 1942 in the United States there were 9,633 Crucible furnaces, with a total capacity per charge of 2,693,704 lbs.; today, 1946, there are 13,891 Crucible furnaces with a total charge capacity of 4,976,305 lbs. Methods, like men, show their true worth under stress. Crucible melting in the war years of drive for non-ferrous production, increased 44.2% in number of furnaces, 85.4% in capacity per charge! Convincing proof that Crucible melting of non-ferrous metals gives the highest quality metal at lowest cost.

Let us send you the Crucible Melters' Handbook; write for it today.

CRUCIBLE MANUFACTURERS ASSOCIATION

90 WEST STREET, NEW YORK 6, NEW YORK.

(*Continued from page* 212)

directors for the year 1946-47; Chairman, H. M. Patton, American Hoist & Derrick Co., St. Paul; vice chairman, Sheldon P. Pufahl, Paul Pufahl & Son Foundry Co., Minneapolis; secretary-treasurer, Alexis Caswell, Manufacturers' Association of Minneapolis Inc. Directors for three years: Carleton C. Hitchcock, Edwin R. Frost and Robert C. Wood; Director for two years: Clifford Englund.

The AFA Pattern Apprentice Contest will have three contestants from the chapter: Everett Pulley, Central Machine Works, Minneapolis; Richard C. Mack, American Hoist & Derrick Co., St. Paul; and Fred Dick, Midwest Pattern Co., Minneapolis. All of the three had their training period interrupted by the war and have resumed since discharge.—*J. W. Costello.*

Northwestern Pa.

REGULAR monthly meeting of the Northwestern Pennsylvania Chapter of the AFA was held Apr. 22 at the Moose Club, Erie, Pa. "Stump the Experts" was what the members and guests tried to do. Decision was a draw, as announced by Kenneth Guyer, Cascade Foundry Co., who acted as quiz-master. The "experts" were: Joseph Shuffstall, National-Erie Corp.; John Clarke, General Electric Co.; Earl Strick, Erie Malleable Iron Co.; Clarence Fitz, Hays Mfg. Co.; Fritz Diemer, Cascade Foundry; Jack Gill, Lake Shore Pattern Works; and Sam Holmes, Chicago Pneumatic Tool Co.

Retarding of solidification of metal in the heads of various types of metals was discussed by the experts. There was divided opinion among the group members as to the proper method of mixing core sand and whether water, oil or both should be added first, last or together. It was finally decided that it makes no difference when they are added but both of these ingredients are required with sand and binders to make cores.

Foundry exhibit sponsored by the Northwestern Pennsylvania Chapter will be held at the Erie Y. M. C. A. June 5, 6 and 7. Originally scheduled for the middle of May, the exhibit will comprise five main divisions—patternmaking, steel, malleable, gray iron and nonferrous. Its purpose is to stimulate interest of Erie district citizens in the foundry industry, with the hope of attracting some to adopt a foundry career, and to create good will for foundries in general. Exhibits will show local products and their use of castings.

The following officers and directors were nominated to serve for the 1946-47 chapter year: Chairman, Earl M. Strick, Erie Malleable Iron Co.; vice chairman,

(*Continued on page* 216)

USE MICRONEX TO SEE YOUR PRODUCT IN ACTION

The ways you can use—and profit from—Micronex rate it as a phenomenal production tool. For it generates x-rays so fast and powerful they open new doors in the study of internal structure and motion.

Basically, Micronex operates on the surge-generator principle, building up great reserves of power which are released in one instantaneous burst to activate the x-ray tube. This is the key that enables Micronex to answer important questions.

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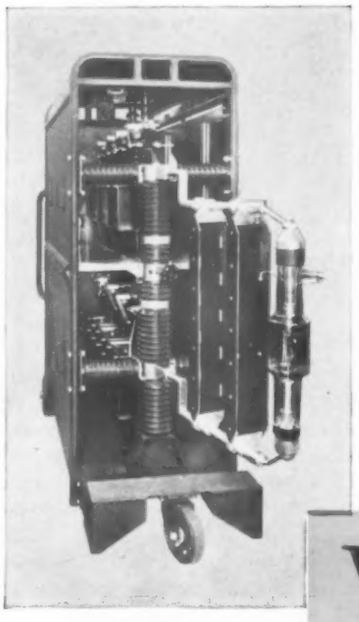
Want to know more about life and behavior of cutting oils? Micronex shows you when and where they break down.

Want to investigate metal stresses under forming, spinning or forging operations? Micronex spots them accurately.



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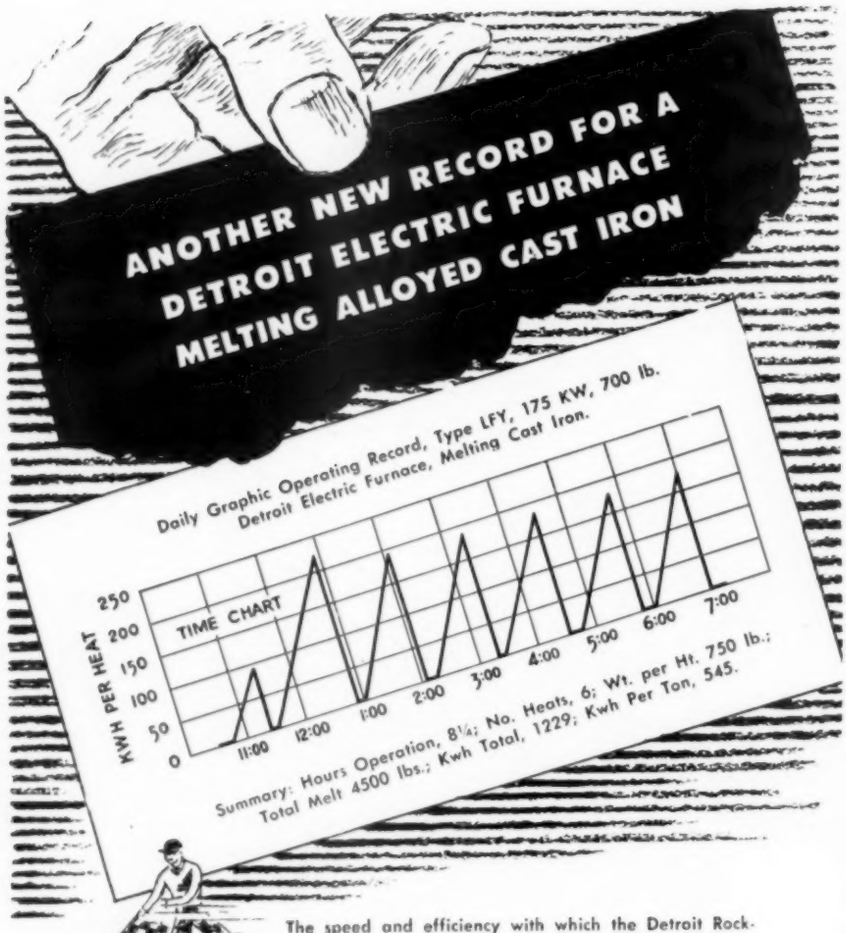
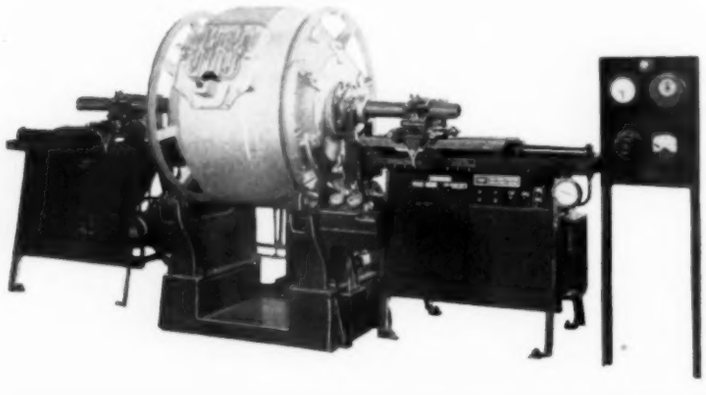
PLANTS IN 25 CITIES . . . OFFICES EVERYWHERE

Electronics at Work



The speed and efficiency with which the Detroit Rocking Electric Furnace melts ferrous metals is clearly demonstrated in the above graph of a typical day's operation. In 8¼ hours, a Type LFY, 175 Kw, 700 lb. Detroit Electric Furnace melted six 750 lb. heats of cast iron, with only one man weighing charges, charging and operating the furnace. Total melt—4500 lbs.! Total power consumption—1229 Kwh! That's only 545 Kwh per ton, and because melting factors such as time, composition, and temperature were under constant and precise control, the metal was higher in quality as well as lower in cost. With conical shell design, the Type LFY Detroit Electric Furnace is equipped with hydraulic manual and automatic electrode control on stationary pedestals which also contain all electrical switches thus affording the operator finger-tip control. Send us your ferrous and non-ferrous melting requirements. Our engineers will be glad to study them without obligation and recommend the specific Detroit Electric Furnace that will speed economical melting in your plant.



DETROIT ELECTRIC FURNACE DIVISION
KUHLMAN ELECTRIC COMPANY • BAY CITY, MICHIGAN

(*Continued from page* 214)

John Clarke, General Electric Co.; secretary, Harry L. Gebhardt, United Oil Mfg. Co.; treasurer, Douglas James, Erie City Iron Works. Directors for three years: J. A. Shuffstall, National-Erie Corp.; Jack Gill, Lake Shore Pattern Works; and George Johnston, Cooper-Bessemer Co. Directors for two years: Fred Eisert, Urick Foundry Co.; Tom Beaulac, Chicago Pneumatic Tool Co., and Clarence Fitz, Hays Mfg. Co. Directors for one year: Roger Griswold Jr., Griswold Mfg. Co.; William Miller, Frederic B. Stevens Inc.; Joseph Hornstein, Meadville Malleable Iron Co.; and Roger Carver, Standard Stoker Co.— *Earl M. Strick, reporter.*

Cincinnati

REGULAR monthly meeting of the Cincinnati District Chapter of the AFA was held Apr. 8 at the headquarters of the Engineering Society. Chairman A. W. Schneble presided. An interesting film entitled "Tin from Bolivia" was shown.

Jack Caine, metallurgist, Sawbrook Steel Castings Co., Cincinnati, was guest speaker and presented a most interesting talk entitled "What Is Strength?" He pointed out that anyone connected with the foundry industry should be vitally interested in strength, for it is what foundrymen sell. The casting is only so much dead weight, and is useful for its service strength alone. Mr. Caine covered the newer concepts of strength, not tensile strength, but ability to perform in service. He stated that foundrymen know that castings possess this all-important service strength and their job is to convince the user. This can and must be done. — *J. Schumacher, vice chairman.*

Canton

CANTON District Chapter of the AFA met March 21 at the Portage Hotel, Akron, O., with approximately 90 members and guests in attendance. Conrad Traut, the Hoover Co., Canton, presented another in his series of talks on "The Job Relations School," discussing various problems, how they may be discovered, and what can be done about them.

John M. Kane, chief engineer, Dust Control Division, American Air Filter Co. Inc., Louisville, gave an illustrated talk on "Control of Dust." The advantages and disadvantages of different types of dust collection systems were discussed, as well as air velocities and their relation to maximum efficiency. Slides showing dust conditions in plants before proper ventilation, and after installation of proper facilities for collection, proved the speaker's point

(*Continued on page* 218)

In KORBOND *it's Uniformity!*

It is this laboratory controlled uniformity in KORBOND Core Oils which makes them a highly treasured asset in modern foundry practice. KORBOND is especially fine for more particular work or where oven conditions are unfavorable, such as high heat or uncontrollable time. Most KORBOND oils are on the high side of linseed for strength and where the thin sections of cores must be formed without the use of rods or wires, or for nickel steel castings, KORBOND does the job with less oil thus producing much less gas on pouring. Try KORBOND Core Oils. You can be sure every shipment will be uniform.

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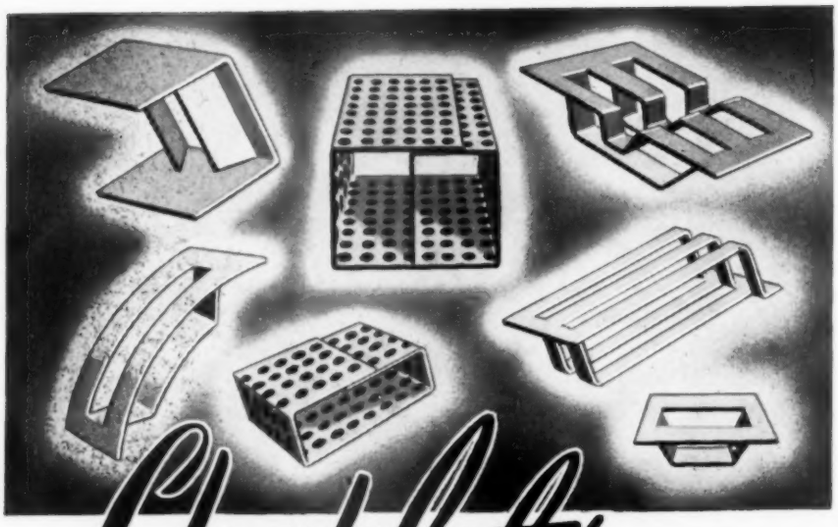

Chaplets AND Chills
BY MILWAUKEE

— are recognized throughout the foundry industry as dependable aids to higher and better production. Trifles in themselves, they have been constantly improved through the years . . . in both design and quality . . . to help the foundryman toward the production of castings which reach the highest possible degree of perfection.

Write for samples and prices of Milwaukee Thread Stem Chaplets . . . Standard Radius Chills . . . Schmitz Chaplets . . . Angle Chaplets . . . Patented Adjustable Radius Chills . . . Shells, Tubes . . . other types of Chaplets and Supplies.

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(*Continued from page* 216)

At the April 18 meeting of the chapter, held at the Mergus Restaurant, Canton, 70 members and guests heard Mr. Traut give his concluding talk on "The Job Relations School," in which he called attention to the individual's personal responsibility of his own job and his relation to other departments. Members have found Mr. Traut's talks instructive and interesting throughout the year.

Two groups assembled for round-table discussions. K. F. Schmidt, United Engineering & Foundry Co., led the group on consideration of cast iron, and F. K. Donaldson, Machined Steel Castings Co., directed the technical meeting on steel.

The nominating committee read the following slate for nominations for officers to serve during the year 1946-47: Chairman, I. M. Emery, Massillon Steel Casting Co., Massillon, O.; vice chairman, Charles F. Bunting, Pitcairn Co., Barberton, O.; treasurer, Otis D. Clay, Tuscora Foundry Sand Co., Canal Fulton, O.; secretary, Chester B. Williams, Massillon Steel Casting Co., Massillon. Five nominations were made for directors of each of the three sections—eastern, western and central—three in each group to be elected. —*Nils E. Moore, reporter.*

Saginaw Valley

ANNUAL business meeting of the Saginaw Valley Chapter of the AFA was held May 2 at Frankenmuth, Mich., with the following new officers and directors elected:

Chairman, John F. Smith, Chevrolet Gray Foundry, Saginaw; vice chairman, Marshall V. Chamberlin, Dow Chemical Co., Midland, Mich.; secretary-treasurer, Francis S. Brewster, Dow Chemical Co., Bay City, Mich. Directors for three years: Lyle Clark, Buick Motor Division, Flint, Mich.; Len Cline, Saginaw Foundries Co., Saginaw; D. D. Bowman, Almont Mfg. Co., Imlay City, Mich. Director for one year: Joseph J. Clark, Saginaw Malleable Iron Division, Saginaw.

Speaker for the evening was Morris Bean, Morris Bean Co., Yellow Springs, O., who discussed "Precision Casting." Mr. Bean described precision castings in general as those cast to close tolerances and with fine finish. He outlined the advances and improvements made in the two general production methods, the employing a permanent pattern while the other uses an expendable wax pattern.

Saginaw Valley Chapter of the AFA held its April 4 dinner meeting at Frankenmuth, Mich., with Dr. C. R. Austin, assistant to the vice president of the Meehanite Metal Corp. as principal speaker.

Dr. Austin devoted the first portion of

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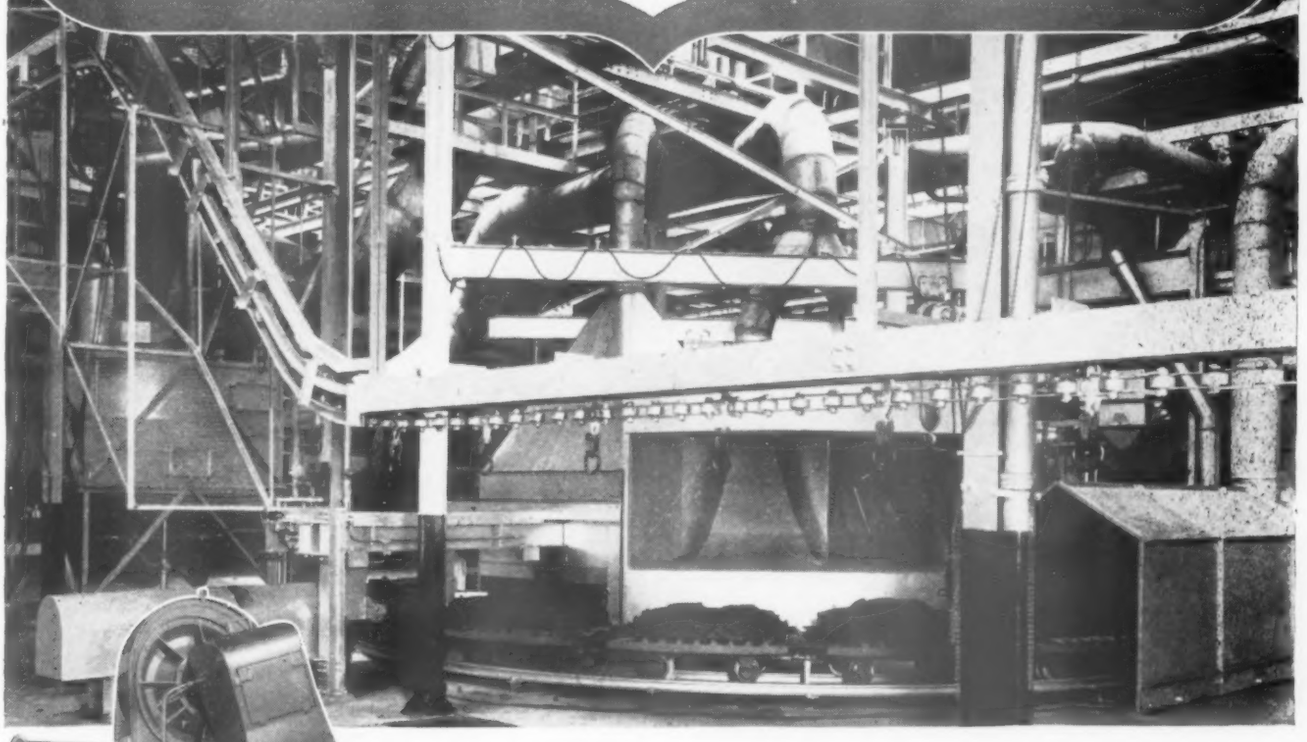
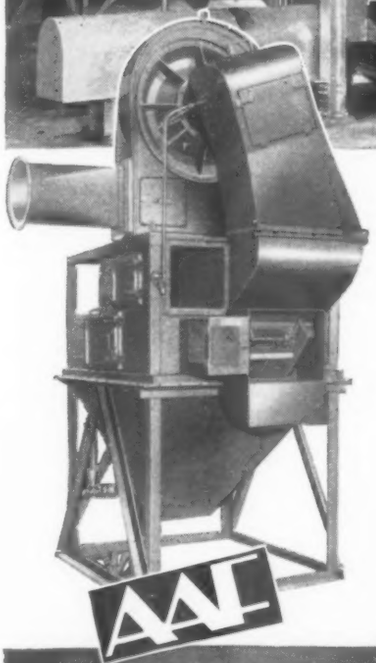
ROTO-CLONE*

for automotive foundry

DUST CONTROL





IN heavy duty shakeout service Roto-Clone has proved its value through years of successful performance. The Type W Roto-Clone, which can be seen in the background at the left of the picture above, exhausts the cope and drag shakeout and the casting removal station. This Roto-Clone dust control installation is typical of many such systems serving leading foundries throughout the country. For information on the Type W Roto-Clone (wet-type) for foundry service, ask for Bulletin No. 274A.

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TYPE W ROTO-CLONE

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(*Concluded from page* 218)

his talk to the treatments and test methods used in subcritical heating for stress relieving. Slides were used to show the effect of temperature and time upon the percentage of stress relieved.

The second portion of the lecture dealt with heat treatment of cast irons at temperatures above the critical range, for improvement of properties. Comparisons were made of properties obtained in iron in the as-cast state, after the conventional quench and draw treatment, etc.

A coffee talk, featuring humorous anecdotes, was presented by J. George O'Brien of Saginaw.—*Joseph Clark, reporter.*

Wisconsin

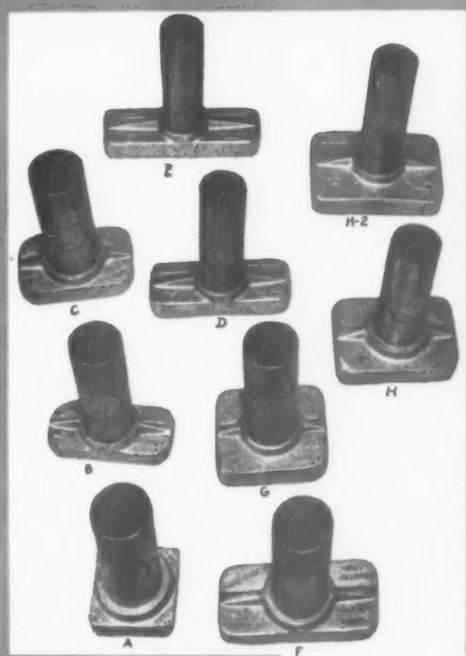
AT THE regular monthly meeting of the Wisconsin Chapter of the AFA, held Apr. 12, at Hotel Schroeder, Milwaukee, roundtable technical sessions were held preceding the report of the nominating committee. The following selection of officers and directors to serve during the year 1946-47 was announced: President, David Zuege, Sivyer Steel Casting Co., Milwaukee; vice president, Ross Anderson, Belle City Malleable Iron Co., Racine; secretary, Robert Woodward, Bucyrus-Erie Co., South Milwaukee; and treasurer (re-elected) R. F. Jordan, Sterling Wheelbarrow Co., Milwaukee. Two new directors were named: Arthur Higgins, Allis-Chalmers Mfg. Co., and C. Lewis, Badger Malleable & Mfg. Co., South Milwaukee. The meeting was attended by 247 members and guests.—*John E. Hubel.*

Connecticut Group Plans Party

A meeting to be devoted exclusively to dinner and entertainment has been announced by Connecticut Nonferrous Foundrymen's Association, which will be held Friday, June 21, at Wilcox Pier Restaurant in Savin Rock, West Haven, Conn., beginning at 5 p.m. Committee in charge of arrangements includes: C. P. Crotty, Nassau Smelting & Refining Co., New York, chairman; D. W. Case, Belknap Mfg. Co., Bridgeport, vice chairman; T. J. Judge, Jenkins Bros., Bridgeport; T. Egan, S. Greenfield Co., Buffalo; H. Dingee, Springfield Facing Co., Springfield, Mass.; S. W. Chappell Jr., Electric Boat Co., Groton, Conn.; D. W. Sawtelle, Malleable Iron Fittings Co., Branford; W. Slater, Whitehead Bros. Co., Providence, R. I.; P. Trook, Joseph Dixon Crucible Co., Jersey City, N. J.; G. Liff, Klein-Ferris Co., Boston; F. Diana, Whipple & Choate Co., Bridgeport; R. Hunter, Hunter Sales Co., Boston; and W. L'Hommedieu, American Crucible Co., Shelton, Conn.

THE IMPROVED Redford CORE BLOWER
CARTRIDGE BENCH TYPE

FOR EFFICIENT PRODUCTION OF SMALL, INTRICATE CORES



STANDARD SAND CARTRIDGES

The Standard Sand Cartridges are a cast aluminum base into which a seamless steel tubing (2½" or 2¾" Dia. x 8" long) is pressed. The bottom of the base is closed with an ⅛" cold rolled steel plate, in which holes are to be drilled to match the blow-holes of the core box.

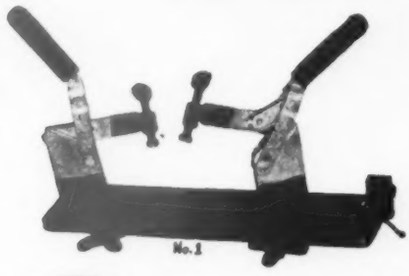
SIZES	WIDTH—LENGTH	PRICE
A	2⅜ x 3⅜	$10.00
B	2⅜ x 5⅜	11.00
C*	3 x 5⅜	11.00
D	2⅜ x 7⅜	12.00
E	2⅜ x 8⅜	12.00
F	3 x 7⅜	14.00
G	4⅜ x 5¼	14.00
H	4⅜ x 6¾	15.00
H2	4¾ x 7¼	15.00

To find outside dimensions, add ¼" to width and length of inside dimension.

Special size Sand Cartridges furnished upon application.

*This size adaptable to a large range of core boxes.

1. Core Box Clamping Attachment for blowing vertically split core boxes. (On end)
2. Core Box Drawing Attachment—used with No. 1 for drawing difficult cores.
3. Vibrator and Knee Valve — air or electric furnished with No. 2.



WHAT USERS SAY

Enclosed check $295.00, which we send with pleasure. We thank you for your interest and print on this core, which was blown perfectly as per your instructions. An additional order is placed for 550 more castings and we will consider the machine paid for.

We purchased a Redford cartridge bench core blower eight months ago and in that time we have saved its cost many times in labor savings.

An experienced core maker is not necessary to operate it efficiently.

It is adaptable to all small work and easy to set up.

The relatively small commission you will make from the sale of this core blower will never free you from the necessity of working like hell to make a living. However, if everything you sell gives the same service and satisfaction that this core blower is giving us, you will inevitably obtain such freedom, but soon.

Being so pleased with our Redford Cartridge Bench Core Blower, we feel that this information should be passed along to you.

The initial investment being so small, it was no time when the blower paid for itself. Production increased tremendously and because of the wide range even short runs are being blown.

*Names of these endorsers furnished upon request

PRODUCES SMALL, INTRICATE CORES WITH REMARKABLE SPEED AND SIMPLICITY

Quickly and economically installed. Does not require a large volume of air—½ c f.m is sufficient.

A ¾ inch air line with 80 to 120 lbs. pressure is ample to make cores in single or gang boxes requiring a maximum of 2 lbs. of sand.

To blow core boxes of different height, shape or size, adjustments may be made instantly by the operator.

The Improved REDFORD Core Blower, Cartridge Bench Type, has an arm support column at the rear which provides an air reservoir to give additional volume of air per blow. Blow gun at base of column assures dry air at all times. All condensation in reservoir may be removed when using blow gun.

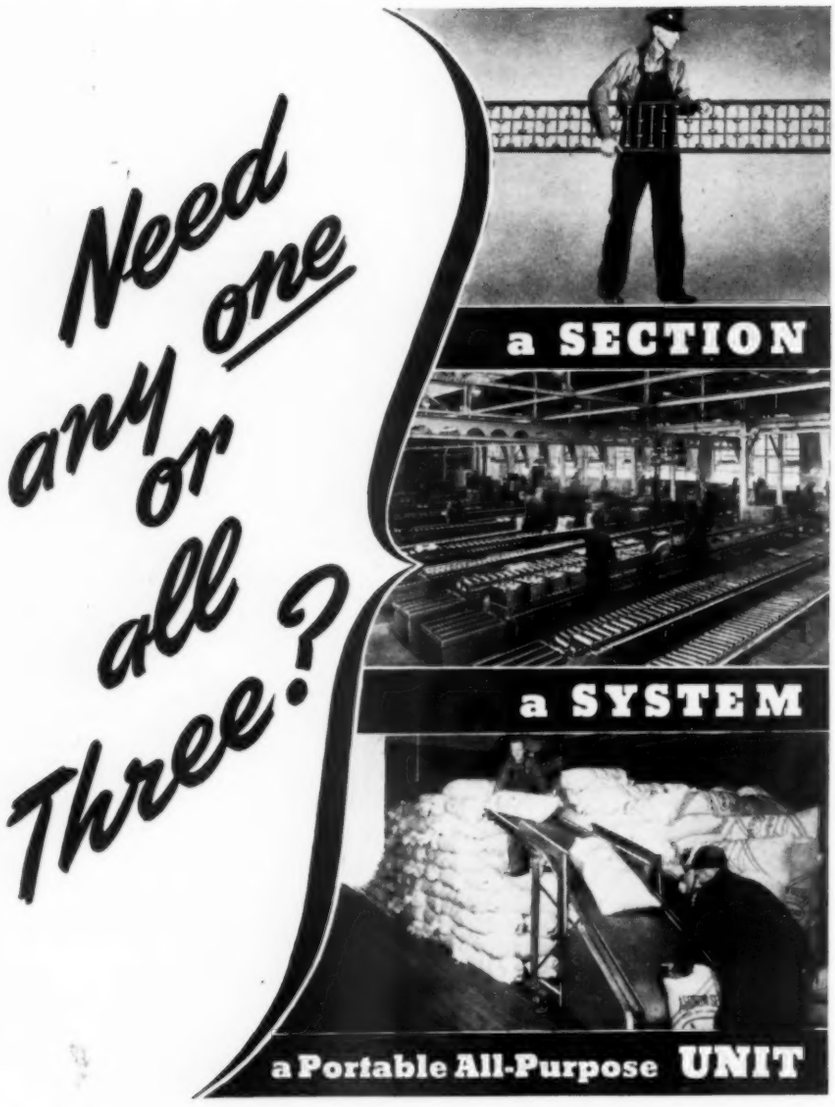
Sand Cartridges are made a part of the core box equipment. The base of a cartridge is determined by the blowholes in the box. However, one cartridge may be used for several core boxes of approximately the same size. The cylindrical part of the cartridge must be high enough from the base to hold sufficient sand to fill the core box once.

Write for Folder and "Seven Facts" regarding core blowing

REDFORD IRON & EQUIPMENT COMPANY

PHONE: REdford 8610

21315 WEST McNICHOLS ROAD **DETROIT 19, MICHIGAN**



THE range and versatility of Standard Conveyor equipment is the result of nearly 40 years of close contact with conveying problems — large and small installations.

If you need just a light, portable section of conveyor to speed handling in warehouse or on shipping platform — complete, continuous flow system linking manufacturing or packaging operations — or a portable unit to speed handling in storage and shipping areas — Standard Conveyor Company can supply you with any one or all three.

Write for "Conveyors by Standard" Bulletin No. F-66 — a valuable conveyor reference book that will be useful to you.

STANDARD CONVEYOR CO.
General Offices: North St. Paul 9, Minn.
Sales and Service in Principal Cities

MEMBER
MANUFACTURERS ASSOCIATION FOUNDRY EQUIPMENT

ROLLER · BELT · SLAT · PUSHBAR CONVEYORS • PORTABLE CONVEYORS AND PILERS • SPIRAL CHUTES • PNEUMATIC TUBE SYSTEMS

Aircraft Quality Castings

(*Continued from page* 101)

crack. A cold shut occurs where material flows together from different directions but fails to unite.

Surface Irregularities: Surface irregularities occur at the surface and are usually detectable by visual inspection. Their appearance on the radiograph will depend on the nature of the irregularity. These irregularities will include mold marks, excess metal, adhesions of sand or other impurities, saw cuts, indentations, etc.

The strength of aircraft quality castings is most frequently affected by shrinkage irregularities. Freedom from shrinkage not only depends on proper foundry technique but on proper design and sufficient pattern shrinkage allowables.

Northrop has found it advantageous to classify shrinkage irregularities in two categories: 1. Primary shrinkage—shrinkage occurring *prior* to solidification. 2. Secondary shrinkage—shrinkage occurring *after* solidification.

Primary shrinkage irregularities include:

Shrinkage Cavity (Fig. 17): Shrinkage cavities appear on the radiograph as dark regions of sharp and usually jagged outline. These characteristics occur as jagged or dendritic shaped cavities and are in general caused by the contraction of liquid material in locations where the feeding is inadequate.

Shrink Porosity (Fig. 18): Shrink porosity appears on the radiograph as dark regions of irregular shape consisting of minute dendritic patterns. Shrink porosity is generally an overall dispersed shrinkage in which the cavities are very small. This results in a spongy type of crystalline structure.

Micro Shrinkage (Fig. 19): This irregularity occurs most frequently in magnesium alloys and appears on the film as dark feathery streaks or dark areas. It usually consists of a network of very fine cavities in the grain boundaries. Micro porosity as a result of high temperature oxidation (burning) in heat treatment resembles micro shrinkage on the radiograph.

Centerline Shrinkage (Fig. 20): Centerline shrinkage usually consists of a string of shrinkage cavities.

Pipe (Fig. 21): Pipe is an elongated cylindrical shrinkage cavity usually parallel to the direction flow of the metal.

Secondary shrinkage irregularities included:

(*Concluded on page* 227)

FOR EFFICIENT *Dust recovery*

SPECIFY BUELL'S exclusive... 6

"*Buell's Exclusive 6*" refers to the six design features which distinguish Buell (van Tongeren) Dust Recovery Systems from all other mechanical dust collectors.

These six mechanically-important features have made possible a three-point record of achievement in industrial dust recovery: (1) high operating efficiency (2) minimum cost of maintenance (3) long life. A record of *guarantees fulfilled*, of *virtually trouble-free service.*

"*Buell's Exclusive 6*" are briefly described in the paragraphs immediately below. In following sequential advertisements each feature will be separately illustrated and described in interesting detail.

1 The "Shave-Off" . . . The patented van Tongeren principle, exclusive with Buell. Utilizes the "double eddy" current, establishing a highly efficient collection force.

2 Large Diameters . . . Permit use of extra thick metal. Afford large dust outlets, prevent clogging. Reduce abrasion.

3 Extra-Sturdy Construction . . . Rolled and welded, one piece construction; hoppers braced with 3" channels to withstand vibration.

4 Correct Hopper Design . . . Plays a most important, often disregarded, part in dust collection efficiency. Dust disposal facility must be anticipated in the initial overall design.

5 Split-Duct Manifolding . . . A prime factor in efficient distribution of the dust load. Buell's manifolding method has flexibility, discharging gases from any side or end.

6 Inner Welds Ground Smooth . . . Proper finishing of inner welds effects operating efficiency, reduces erosion, ensures longer life.

Buell's book—"The van Tongeren System of Industrial Dust Recovery"—illustrates and explains the patented van Tongeren principle and its many applications to industry.

buell
DUST RECOVERY SYSTEMS

BUELL ENGINEERING COMPANY, INC.

14 Cedar Street, New York 5, N. Y.

Sales Representatives in Principal Cities

DESIGNED TO DO A JOB, NOT JUST TO MEET A "SPEC"

B&P Does It Again!

Foundries — both large and small — praise the Model No. 3½ Mulbaro*. It has *proven* acceptance! Now, because of demand for a larger capacity Mulbaro we present . . . THE MODEL NO. 7.

*Model No. 3½ Mulbaro has batch capacity of 3½ cu. ft. . . . the Model No. 7 has a capacity of 7 cu. ft.

The New Mulbaro

It's Really Portable!

Here's the new Model No. 7 Mulbaro . . . outstanding in its portability, flexibility, economy in operation and low initial cost. Like the Model No. 3½, its mulling action is created by two rubber covered wheels which squeeze and knead the sand, eliminating sand slippage and damage to grain structure . . . assuring a thoroughly mulled sand.

The New Number 7 Mulbaro!

Mulling Efficiency Plus!

1

Filled barrow easily pulled by one man to top section or mulling mechanism.

2

Mulling mechanism lowers onto barrow. A button is pressed and Mulbaro is put into operation — then hoist raises top section — mulled sand is taken away.

3

Bowl automatically dumps all the sand. When barrow is refilled, sand is easily shoveled in, and the weight of the sand, as it increases, gradually forces bowl down to a level position.

WRITE FOR NEW BOOKLET THAT EXPLAINS NO. 7 AND NO. 3½ MULBAROS IN DETAIL! The prices of both machines are surprisingly low. Every foundry will find the Mulbaro of great value ... either as an all purpose or auxiliary mullor. Ask for that booklet today!

B&P

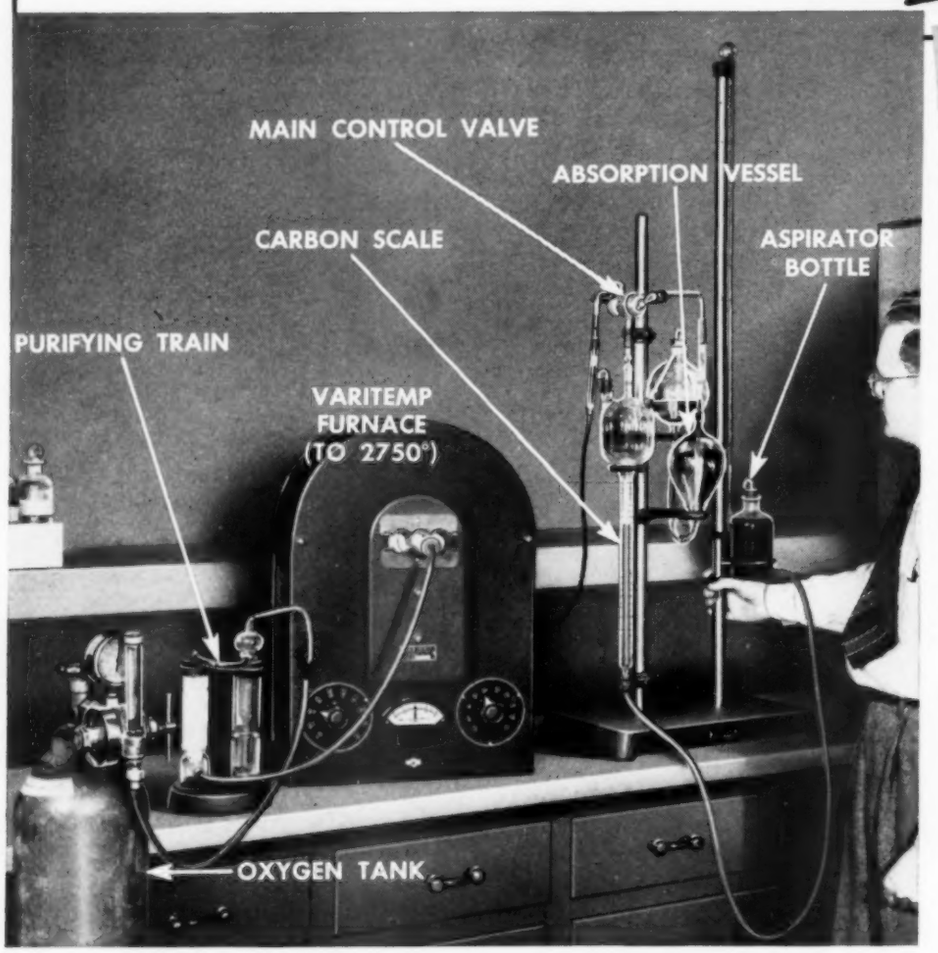
THE BEARDSLEY & PIPER COMPANY

General Offices: 2424 North Cicero Avenue, Chicago 39, Illinois

Plant: 2541 North Keeler Avenue, Chicago 39, Illinois

The Beardsley & Piper Company are manufacturers of Sandslingers, Speedslingers, Speedmullors, Screenarators, Mulbaros, Shake Outs, Sand Conditioning Machines, Gyratory Screens.

DETERMINE CARBON IN *2 MINUTES*



for both IRON and STEEL

With the sample weighed and loaded the test cycle involves only:

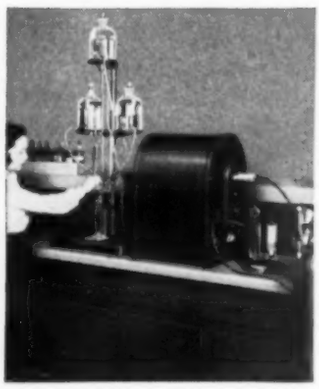
Start and stop oxygen supply.

4 Settings of Main Control Valve.

8 Short Motions of Aspirator Bottle.

Then you read graduated Carbon Scale, correct for temperature and barometric pressure and you have carbon to ⅕ of ONE POINT.

SIMPLE — STRAIGHTFORWARD — ACCURATE AND *NOT EXPENSIVE*



◀ SULPHUR DETERMINATOR

For accurate analyses of metals, coal, coke, etc.

Testing cycle — 2 minutes.

Accuracy to ⅕ of One Percent.

Applicable to either Iodate or Alkaline methods.

MOISTURE TELLER ▶

Determines amount of moisture in a test sample usually within 1 minute and without the use of charts or log tables. Entirely self-contained and sturdily built. Needs no technical operator.

HARRY W. DIETERT CO.

9324 ROSELAWN AVE. • DETROIT 4, MICHIGAN

(*Concluded from page 222*)

Hot Tears (Fig. 22): Hot tears appear on the radiograph as variable width jagged fissures. These irregularities are caused by the parting of the material at elevated temperature.

Cracks: Cracks usually appear on the radiograph as single fine dark lines. A crack is caused by the fracture of solid material which may occur at any stage of production after the initial solidification of the casting.

In conclusion, the author wishes to point out the need for development and research to evaluate the effect of irregularities as shown by radiography or fluoroscopy on the parent metal, and the necessity of controlling shrinkage, both primary and secondary, by a formula so as to enable the designer to design castings that a foundry will be able to manufacture. Only through a program of this nature will it be possible to produce quality castings on a production basis economically and to realize maximum benefits from radiographic and fluoroscopic control.

Editor's Note: The terminology and illustrations of irregularities contained in this paper were prepared by the West Coast Aircraft War Production Council Inc. radiographic interpretation standards group. Acceptance of this nomenclature by national organizations is pending.

Offers Tribute to Patternmaker

An attractive copy, suitable for framing, of Edward Leslie's tribute to the patternmaker has been published by the Kindt-Collins Co., 12651 Elmwood Ave., Cleveland 11, and may be secured on request. Printed in two colors on heavy paper, the 10 x 13-inch sheet carries the following inscription:

"A pattern maker is an exalted craftsman, the greatest common denominator, as well as the least common multiple of all industrial production. A pattern maker must have the creative conception of a draughtsman designer, the practical ability of a molder, the precise skill of a machinist, the analytical judgment of a metallurgist and the specific exactness of a mathematician. He must create a plan, or design, with vision and ingenuity and build the idea from trade to trade with practical knowledge; thinking and forming inside and out with length, breadth and thickness, adjusting accurately all values and dimensions and producing with dexterous finality and conceivable form to be cast in metal.

"The products of the pattern maker's skill are truly surrounded by an aura of greatness which dignifies his right to assume a place of confidence, trust, and honor in all industrial advance and national progress."

The Screenarator is the lowest cost portable sand conditioner! Ideal for small, medium and large foundries, it is fast, versatile and produces a flowable, easily rammed sand. (The *improved* Model "M" Screenarator has a redesigned motor and main frame...also a new retractable handle that facilitates ease of movement and operation).

The operator easily moves Screenarator to desired position from floor to floor. Electrically operated, it plugs into an available power outlet.

THE Improved SCREENARATOR

THE BEARDSLEY & PIPER COMPANY B&P "BETTER METHODS"

The Screenarator's height and angle of screen makes shoveling easy. The Screenarator controls the discharging of the conditioned sand...placing it to any desired distance within 25 ft.

The Screenarator thoroughly screens the sand... frees it from burned cores, gaggers and other foreign matter. It cuts and breaks lumps, aerates the sand, and then aerates it for the second time when it piles the conditioned sand wherever desired.

Write for catalog today!

THE BEARDSLEY & PIPER COMPANY

General Offices: 2424 North Cicero Avenue, Chicago 39, Illinois
Plant: 2541 North Keeler Avenue, Chicago 39, Illinois

The Beardsley & Piper Company are manufacturers of Sandslingers, Speedslingers, Speedmullers, Screenarators, Mulbaros, Shake Outs, Sand Conditioning Machines, Gyratory Screens.

Industry BRIEFS

CLEVELAND Foundry Co., a division of Cleveland Co-operative Stove Co., Cleveland, has begun construction of an addition to its plant at 2818 Harvard Ave., 85 x 245 ft, to cost $350,000. The new two-story structure will house a modern core oven department and will increase the foundry's production capacity by 33 1/3 per cent.

• • •

March sales of foundry equipment represented 536.6 per cent of the 1937-1939 month average, compared with 432.8 per cent in February and 604.7 per cent a year ago, according to the Foundry Equipment Manufacturers Association.

• • •

Controlling interest in Glamorgan Pipe & Foundry Co., Lynchburg, Va., is being acquired by the Societe Anonyme des Hauts Fourneaux and Founderies de Pont-a-Mousson, a French organization, which plans modernization and an increase in personnel.

• • •

Ward Weller Co., Cambridge, Mass., has been appointed New England representative of the Pittsburgh Steel Foundry Corp., Glassport, Pa., and its Fort Pitt Castings Division, in the railroad, marine, heavy automotive and general machinery fields. Ward Weller is head of the Cambridge firm.

• • •

Loftus Engineering Corp., Pittsburgh, has opened a branch office at 185 North Wabash Ave., Chicago. John H. Loux is in charge of the new office which will offer consulting, engineering, designing and contracting services to the steel, aluminum, copper and brass industries.

• • •

Cooper-Bessemer Corp., Mount Vernon, O., plans mechanization of its Grove City, Pa. foundry to alleviate shortage of personnel and to speed up production. New facilities include a continuous molding operation to synchronize complete sand preparatory equipment from shakeout to mold. Molds will be rammed on a single new type machine accommodating flasks ranging from 27 x 36 to 90 x 120 in.

• • •

Raybestos-Manhattan Inc., Manhattan Rubber Division, Passaic, N. J., has appointed Republic Supply Co. of California as distributor of its industrial products on the West coast. Republic Supply will be under the supervision of A. R. Bradshaw, San Francisco manager for Manhattan, and R. G. Hueman, Manhattan factory representative, will make his headquarters at Republic.

• • •

Triple A Metalcraft Corp. has taken over the plant and production facilities of the A & F Aluminum Products Co., at 3421 East 22nd St., Los Angeles, for the production of cast aluminum cooking ware. C. J. Amick, president and general manager of the new company, was formerly vice president and general manager of Century Metalcraft Corp., Los Angeles. R. M. Allan, who served as president and general manager of A & F Aluminum Products Co., is vice president. E. D. Amick, son of the president, is another director of the new concern. Other directors include C. R. Fleishman, president, A. J. Bayer Co., Los Angeles, L. F. Mulherin, R. L. Shoemaker and H. J. Wehrung.

• • •

Linde Air Products Co., unit of Union Carbide & Carbon Corp., New York, has begun construction of a new oxygen filling station, acetylene producing plant and warehouse, in Evansville, Ind., in addition to the warehouses of the company which are already located there. New facilities are expected to be in operation by July 15.

• • •

National Casting & Mfg. Co. Inc, 25839 West Seven Mile Road, Detroit, has been formed for the production of nonferrous castings. Paul E. Gery is president and general manager of the new company.

• • •

Cincinnati Foundry Co., Cincinnati, has been reorganized and incorporated with $150,000 capital. George A. Euskirchen is president, Rosella Euskirchen, vice president, and George Diersing, secretary-treasurer of the corporation.

• • •

S. & M. Pattern Co. is the firm name under which Hubert C. Smith, C. Curtis Smith and Robert W. Marks have published a certificate that they are conducting business at 1313 East 61st St., Los Angeles.

• • •

Supreme Foundry & Mfg. Co., Belleville, Ill., has disposed of a four-fifths interest to the Qualified Range Co. and Karr Range Co., both of Belleville. The foundry will furnish complete castings requirements of the two range companies but will also handle a limited volume of commercial orders. Edward A. Karr is president of both the Karr and Supreme companies.

• • •

Whitewater Mfg. Co., Whitewater, Wis., recently reorganized and incorporated, has added a foundry, with 10-ton capacity cupola for production of gray iron castings. Robert Stevenson is president of the company, which he bought as a machine shop in 1944 after managing it for several years.

• • •

Mathieson Alkali Works Inc., New York, plans construction of a pilot plant at Niagara Falls, N. Y., to cost $150,000. The company recently reorganized its research department, with G. P. Vincent as technical director, with a view to increased co-ordination between research, sales development, and plant operations.

• • •

Paul Koenig and Louis Martin have started construction of a new foundry building at 6105 Maywood Ave., Huntington Park, Calif., 60 x 80 ft, to cost $15,000.

• • •

H. I. Langley and H. L. Bierley have begun erection of a new foundry building at 3165 Slauson Ave., Huntington Park, Calif., 81 x 200 ft, to cost $30,000.

• • •

New Hampshire Forge & Foundry Corp., Salmon Falls, N. H., suffered damage estimated at approximately $100,000, when fire caused by sparks from a nearby grass fire ignited the plant.

• • •

Keystone Abrasive Wheel Inc., Carnegie, Pa., has rebuilt and resumed operations of its plant which was destroyed by fire last October. The plant has been modernized throughout and new equipment and machinery has been installed for production of abrasive wheels.

• • •

General Casting Co., Morral, O., plans to rebuild its foundry which was destroyed by fire Apr. 4, with damage estimated at approximately $13,000.

• • •

Beloit Castings Co., Beloit, Wis., has begun construction of a new foundry building of steel and concrete, 120 x 160 ft, to cost approximately $75,000. At the front, in a two-story section, the offices of

the company will be located. A one-story section in the rear will house foundry operations.

• • •

McMahon Foundry Co. is the firm name under which Edward M. McMahon and William Steinberg have published a certificate that they are conducting business at 2510 East 52nd St., Huntington Park, Los Angeles.

• • •

An addition to the foundry building of Renfrow's Gray Iron Foundry is being erected at 4913 San Fernando Rd., Los Angeles, 40 x 46 ft, to cost $3500.

• • •

Meriden Foundry Co., Meriden, Conn., plans construction of a one-story plant, 105 x 160 ft and 22 x 25 ft, to cost approximately $60,000.

• • •

Glenwood Range Co., Taunton, Mass., plans additions and improvements to its plant, to cost approximately $40,000.

• • •

Ideal Castings Co., Albion, Mich., has been incorporated by Lyle M. Johnson, with $100,000 capital, to engage in a foundry and machine shop business.

• • •

Crucible Steel Casting Co., 8401 Almira Ave., Cleveland, plans improvements including installation of sand conveyor system and structural changes, to cost $200,000.

• • •

Saturn Foundry & Machine Co., Wheeling, W. Va., plans construction of a two-story foundry and machine shop, 115 x 128 ft., to cost about $50,000.

• • •

Industrial Fabricating Inc., Eaton Rapids, Mich., has started construction of an addition to its plant, 40 x 70 ft, for production of foundry flasks and jackets.

• • •

Lakeside Aluminum Co., Menominie, Wis., is building a new one-story foundry building, 50 x 260 ft, of prefabricated type. Plans to extend the oil tank and pump house of the old building are included.

• • •

Rogers Pattern & Foundry Co., 910 East 60th St., Los Angeles, plans construction of an addition 45 x 20 ft, to its foundry building, to cost $1950.

• • •

K. & L. Pattern & Mfg. Co. is the firm name under which F. H. Krauss and O. J. Lancaster have published a certificate that they are conducting business at 10349 Long Beach Ave., Lynwood, Calif.

• • •

A new foundry building 40 x 60 ft in area, is being erected at 6513-17 Wilson Ave., Florence District, Los Angeles,

CHOOSING THE RIGHT
Dings Lifting Magnets
for your jobs...

• How big?
• Heaviest loads?
• Kind of material?
• Costs . . .
—Better, faster materials handling?
—Operation and maintenance?

BUILDING the finest lifting magnets that 47 years of experience can design is only part of the Dings job in seeing that you get top, long-run efficiency for the particular jobs your Dings Lifting Magnets have to do.

Lifting magnets too big for the job run up unnecessary operating costs . . . Magnets too small waste time and money in extra lifts required . . . The type of material handled sometimes makes a tremendous difference in lifting magnet tonnage capacities . . . For example a 65" Dings Lifting Magnet will pick up slabs weighing 65,000 lbs.—but will lift only 3,500 lbs. of melting scrap!

You can be sure of getting the *right* lifting magnets for fastest, most economical handling of your materials by calling in Dings Engineers to make recommendations on your particular jobs.

Remember: size for size, *no one* builds more powerful lifting magnets than Dings!

This new Dings Catalog has the facts!

Just off the press! A new Dings Lifting Magnet Catalog full of illustrations, performance and operating data, lifting magnet power requirements, and the reasons, in design and construction details, why Dings Lifting Magnets give you dependable, full-power lifting ability over long periods on the toughest jobs. Ask Dings for Catalog No. 220 today!

Dings Magnetic Separator Co.
512 E. SMITH STREET, MILWAUKEE 7, WIS.

Dings
"HIGH INTENSITY"

"SEPARATION HEADQUARTERS SINCE 1899"

OTTAWA SILICA CO. *offers...*

WASHED
DRIED
SCREENED
GRADED
WHITE SANDS

Our specially prepared SILICA SANDS are available in various sizes. We have the particular grade best suited for your requirements. ¶ You will find our SANDS most suitable for cores—they save oil—they are clean, uniform and constant in quality. ¶ SILICA FLOUR, at its best, for foundry uses.

OTTAWA SILICA COMPANY
Ottawa, Illinois

for Anthony Schifflier. Estimated cost is $4800.

• • •

Bernard W. Funk has leased the foundry formerly operated by Bauer Bros., Swansea, Ill., and has installed equipment for the manufacture of gray iron castings. The new firm will be known as the B. W. Funk Foundry Co. Mr. Funk, recently released by the Navy, was formerly in charge of the foundry of the Independent Engineering Co., O'Fallon, Ill.

• • •

Sterling Casting Co., South Gate, Calif., is the firm name under which Ira W. Charles and Donald M. Walker have published a certificate that they are conducting a foundry business at 5321 Tweedy Ave., that city.

• • •

Kennametal Inc., Latrobe, Pa., has opened a new office at 538 North Erie St., Toledo, O., in charge of E. D. Porter, who will handle distribution and servicing of single-point tools and milling cutters in that area.

• • •

Camden Iron & Brass Works, Camden, S. C., has been acquired by A. Stanley Llewellyn, until recently an executive in the textile industry at Spartanburg, S. C. C. C. Shaw, owner and manager of the Camden Iron & Brass Works for the last 25 years, will continue as manager for the present.

• • •

Electric Steel Foundry Co., Portland, Oreg., plans construction of a foundry building in Danville, Ill., to cost about $30,000.

• • •

Foundry, polishing rooms and machine shops of the Kent Foundry Co., Bloomfield, N. J., manufacturers of aluminum ware, were destroyed by fire of undetermined origin Apr. 8.

• • •

Springfield Facing Co. has moved its main offices from Springfield, Mass., to its plant at Willimansett, Mass. Last fall this company moved its offices and warehouse in Newark, N. J., to Harrison, N. J., H. E. Beckman is president.

• • •

Globe Iron Foundry is building an addition to its foundry building at 5631 East Randolph St., Los Angeles, to provide 3000 sq ft of additional floor space, to cost $8000.

• • •

Locke Stove Co., Kansas City, Mo., has acquired the East St. Louis, Ill., plant of the Eagle Foundry Co., and will continue operations there.

• • •

Alu-Brass Inc., 657 Evans St., Cincinnati, has been formed by George J.

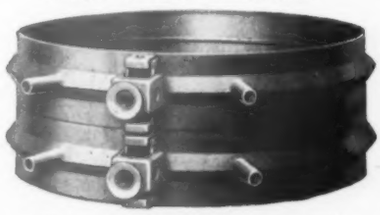
(*Continued on page* 232)

A LIST THAT KEEPS ON GROWING

Now, OVER 4000 FOUNDRIES USE STERLING FLASKS

Style "LL" with Angle Reinforcement and Two-Man Lift Handles.

Style "⅜ NT-NNT" Heavy Duty Flask with Clamping Bars and Clamps. (Patent No. 1974292).



Style "BBLT" with Trunnions and Two-man Lift Handles.

Year after year, the list of foundries using Sterling Steel Flasks continues to grow. Today, this list comprises more than 4,000 names of satisfied users. Experienced foundrymen prefer Sterlings because these better flasks retain their rigidity and accuracy under constant production pressure. They are lightweight and compact, for fast and easy handling . . . yet ruggedly constructed from special rolled steel channels. Available in a variety of styles and shapes to fit practically every foundry production need. For complete foundry flask service . . . consult STERLING.

Sterling
FOUNDRY FLASKS

STERLING WHEELBARROW COMPANY • MILWAUKEE 14, WIS., U. S. A.

A 4999-1P

NEW PRODUCTION METHOD SAVES POROUS CASTINGS

This new method is particularly applicable to engine blocks and heads, valve and pump housings and other castings intended to retain liquids or air under pressure.

K&W METHOD OF RECLAIMING POROUS CASTINGS

- . . . is effective on practically all metals and alloys.
- . . . fits admirably into mechanized production techniques—it is fast!
- . . . costs little . . . often less than 20c in labor and material to recover a casting costing as much as $15.00 at the point of rejection.

IMPORTANT The statements made here are taken from the daily experience of some of industry's most important production foundries.

K&W METHOD OF RECLAIMING POROUS CASTINGS has been used successfully by the automotive industry for more than 10 years.

For further information, write

KERKLING & COMPANY

Industrial Division: 334 N. Ogden Ave., Chicago 7, Illinois
Plants: Burbank, Calif., Bloomington, Ind., and Chicago

(*Continued from page* 230)

Jauch, George F. Stewart and J. R. Stewart, with $10,000 capital, to fabricate aluminum and brass. Sole proprietorship formerly was held by George J. Jauch.

• • •

Supermold Corp. of California, Lodi, Calif., has acquired the Monarch Foundry & Engineering Corps., Stockton, Calif. R. E. Noack, son of one of the founders of the Monarch foundry, will remain as general manager of the plant, which will be devoted to production of castings for tire retreading machinery of the Supermold line.

• • •

Linde Air Products Co., a unit of Union Carbide & Carbon Corp., New York, has plans for a new oxygen filling station and acetylene producing plant, to be located at Centre Ave. near Owyhee St., Boise, Idaho.

• • •

Bowser Inc., Fort Wayne, Ind., has acquired from the Torrington Mfg. Co., Torrington, Conn., the complete inventory of parts and finished units and exclusive manufacturing rights of Torrington lubricators.

• • •

Dampney Co. of America, Hyde Park, Boston, has acquired Thurmalox Co., Doylestown, Pa., for the enlargement of its line of specialized protective coatings for industrial applications.

• • •

Western Stove Works plans an addition to its plant at 8536 Hays Ave., Culver City, Calif., 43 x 114 ft, to cost $5000.

• • •

Herco Co. plans construction of a new foundry building at 2605 East 26th St., Vernon, Calif., to cost $16,000.

• • •

Lake Shore Foundry Co., Waukegan, Ill., producer of brass and aluminum castings, suffered estimated damage of $10,000, when fire, caused by a spark being sucked into a skylight by a fan, swept through the shop.

• • •

Alhambra Foundry Co., plans alterations and improvements to its office building at 1147 Meridian St., Alhambra, Calif, to cost $7000.

• • •

Globe Foundry, 5649 Randolph St., Los Angeles, plans a 25 x 60-ft addition to its foundry.

• • •

State Aluminum Casting Mfg. Co., has moved its offices from 7793 Bryden Ave. to 7623 Tireman Ave., Detroit 4.

• • •

Lisbon Hoist & Crane Co., Lisbon, O., successor to the Wright File Co., of that city, has been formed by Charles

(*Concluded on page* 234)

STOP LOSING MONEY

STOP LOSING MONEY

STOP LOSING MONEY

...get faster shake-out

STOP LOSING MONEY with cores that are tough to shake out! Cores bonded with Hercules Truline* Binder burn out quickly, shake out easily, save up to 50% of valuable cleaning time. Foundrymen report this saving, alone, more than pays for the binder used.

STOP LOSING MONEY with slow-baking cores that tie up your ovens! Truline-bonded cores bake up to 25% faster... often eliminate one extra trip through tower ovens.

STOP LOSING MONEY with cores that lose strength in storage. Moisture-resistant Truline Binder keeps cores stronger over longer storage periods.

STOP LOSING MONEY NOW. Put Truline Binder in your core mixes. Let an experienced Hercules representative suggest how it can save you money. Mail the coupon today for a sample and a descriptive book, giving laboratory-tested mixes.

HERCULES TRULINE BINDER

*REG. U. S. PAT. OFF. BY HERCULES POWDER COMPANY

Naval Stores Department
HERCULES POWDER COMPANY
999 Market St., Wilmington 99, Del.
Send information on Truline Binder ☐ and a sample ☐

Name_____
Company_____
Title_____
Street_____
City_____ Zone____ State____ NB-62

—with a SANDCUTTER

This dependable machine has saved labor for hundreds of foundries. A Warsaw, Indiana foundry reports that a Sandcutter released 13 men from laborious sand cutting operations . . . another in Peoria, Illinois, reports sand cutting reduced 50 man hours a night. This same foundry increased output 33⅓% since adding the Sandcutter, without increasing operating personnel.

With an American Sandcutter you can cut a floor in far less time than by hand shoveling. What's more, the condition of the sand cut by a Sandcutter is infinitely better than that cut by hand. It riddles fast, rams easily and vents perfectly. Sand such as this is bound to result in a better, more uniform casting and reduce scrap losses to the minimum.

Save manpower . . . step up the whole efficiency of your plant operation with a Sandcutter, the modern answer to an old problem: how to condition foundry sand properly, quickly and economically.

Write for Complete Catalog

The booklet "The American Line" will give you full details on Sandcutters and all other A. F. E. Co. products. Get your copy today.

American FOUNDRY EQUIPMENT CO.
505 S. BYRKIT STREET, MISHAWAKA, INDIANA
Sandcutter

(*Concluded from page* 232)

F. and William F. Wright, for the production of electric cable hoists, lifting and conveying equipment.

• • •

Machlett Laboratories Inc., Norwalk, Conn., has moved its offices and laboratories to a newly equipped and enlarged plant at Springdale, Conn.

• • •

Ramona Foundry is the firm name under which Ernest G. Snyder has published a certificate that he is conducting business at 4228 Whiteside St., Los Angeles.

• • •

Johnson & Elliott Aluminum Foundry is the firm name under which Axel E. Johnson, Clarence G. Johnson, Sidney T. Johnson, Axel Elmer Johnson and James Elliott have published a certificate that they are conducting business at 7223½ Cottage St., Huntington Park, Calif.

• • •

Ideal Alloys is the firm name under which Marty Raymondo, Herbert Folk and Elmer Liddaka have published a certificate that they are conducting an aluminum foundry at 6115 Wilmington Ave., Los Angeles.

• • •

Monterey Product Co. plans construction of a foundry at 1018 Chico Ave., El Monte, Calif., 40 x 120 ft, for the manufacture of sand mold aluminum castings. Tom Handley and Joe Carroll are co-owners of the company.

• • •

Miller Foundry Co. has purchased three acres of property in a new industrial tract in Hawthorne, Calif.

• • •

Officers and directors of Michigan Die Casting Co., Detroit, and Gerity-Adrian Mfg. Corp., Adrian, Mich., specializing in chrome, cadmium and silver plating of die castings, have approved a merger of the two companies, to be known as Gerity-Michigan Die Casting Co.

• • •

Pacific Steel Foundry Co., Portland, Oreg., has opened an office in Seattle. Don E. Jordan, formerly associated with the Western Gear Works, Seattle, has been put in charge.

• • •

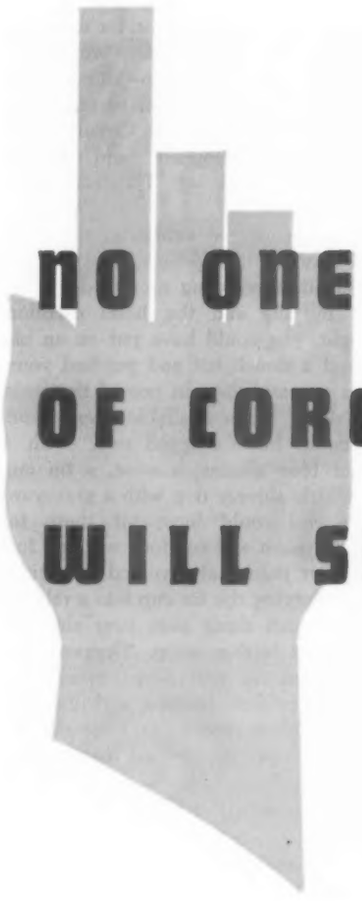
Sheboygan Gray Iron Foundry Corp., Sheboygan, Wis., has changed its name to Austin Gray Iron Foundry Corp.

• • •

Peninsular Grinding Wheel Co., Detroit, has moved its Chicago sales office from 205 West Wacker drive to 5252 North Broadway, Chicago 40.

• • •

Slinger Foundry Co., Slinger, Wis., has been incorporated by Maurice O. Holten, Earl K. Loverud and Stuart Honek, to operate a general foundry.



NO ONE TYPE OF CORE BINDER WILL SUIT ALL FOUNDRIES-

Houghton's HY-TEN series covers the field!

No matter what your preference, Houghton has a Hy-Ten core binder which will meet it—and beat previous performance after careful evaluation of core room procedure.

Some men prefer oxidizing oils of vegetable origin, which are now limited in supply . . . . Others recognize the merits of mineral polymer binders that harden by polymerization rather than by oxidation. . . . Still others see definite advantages in *dry* core binders. . . . And an increasing number are turning to a new Houghton series, based on what is known as the "poly-thermic" process—the HY-TEN 10-70 series, which bake through at relatively low temperatures.

Any and all of these binders are found in the Houghton line of foundry products, and backed by personalized aid from men who know core room practice. We'd like to demonstrate. E. F. HOUGHTON & CO., 303 W. Lehigh Ave., Philadelphia 33, Pa. Plants also in Chicago, Detroit and San Francisco.

Houghton's

PERSONALIZED FOUNDRY SERVICE

The Adventures of BILL

By PAT DWYER
Drawings by RICHEY

THE OLD dogs ain't what they used to be," Bill remarked the other night as he stretched the members out in front and wiggled himself a little deeper into an easy chair. "If that convention had lasted another day I would have been going around in a wheel chair, or hobbling around with a pair of neat but serviceable crutches. Maybe I might have compromised with a good big, heavy cane, something like the 'Shillelagh me father brought from Ireland' on which I could lean with one or both hands while standing in admiration before some of the really remarkable displays of supplies and equipment. The foundry business has traveled a long way since you and I served our time. When every man dragged his castings out of the sand in the morning—and buried the bad ones! He cut over his own sand heap, mixed his own facing, made his own gaggers if he could not borrow or steal them from others, and used his shovel to split soldiers from a piece of board."

"The old dogs may be slipping," I said, "but offhand and not putting too fine a point upon it, I should say the old nimble and inventive mind also shows signs of slipping off the pedestal."

"O yeah? Just to keep the record straight, might I inquire—purely in the interest of science, y' understand—might I inquire how a reference to a pair of tired feet leads you to the totally erroneous conclusion that I am on my last legs mentally? No doubt, you will be surprised to learn that I can see as far as the next fella into a grindstone and can add up 2 and 2 to make 4. Furthermore and in addition thereto—"

"Furthermore and in addition thereto you can tell a hawk from a handsaw, you believe that the early bird catches the worm, that a watched pot never boils, that two heads are better than one and all the other old moth-eaten proverbs and musty sayings. Fairly appropriate in that mythical era when you were serving your time, but *passay*, my boy, utterly *passay*, vanished, out of the picture in the present age of mechanical equipment, world war and atomic bombs.

"However, all that is beside the point, or water over the dam or any other neat and appropriate simile you might call up. I merely wished to direct your attention to the fact that instead of going around in a wheel chair, or on a pair of crutches or a cane, whining, groaning and creaking at every step, you could have taken things easy for a week, rested your feet and incidentally—if you will pardon me for dropping into the argot of the underworld as recorded in modern fiction—knocked off a pile of Jack big enough to carry you through the next Grand Circuit when the beetles are flogged and booted around the track at Thistledown or Randall."

"You interest me strangely, my good man. Pray continue."

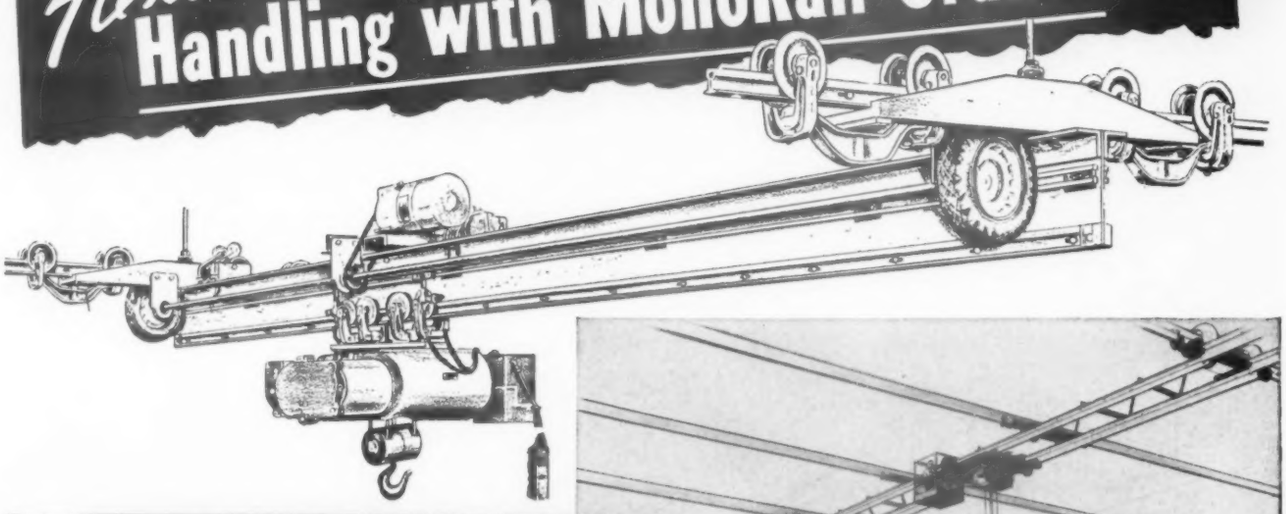
"Instead of prowling up and down the aisles by day and the hotel corridors by night, you could have put on an old suit and a slouch hat and perched yourself in an easy chair in one of the main aisles. Easy chairs available everywhere. You could have snagged one. With a pair of blue glasses, a cane, a tin cup and a little shivery dog with a graveyard cough you could have sat there for hours in peace and comfort, with no further effort than that involved in periodically emptying the tin cup into a reliable leather pouch slung over your shoulder on a stout leather strap. Thousands of men passed up and down every day, men with pockets bulging with easy expense spending money. In my well considered opinion you passed up a golden opportunity."

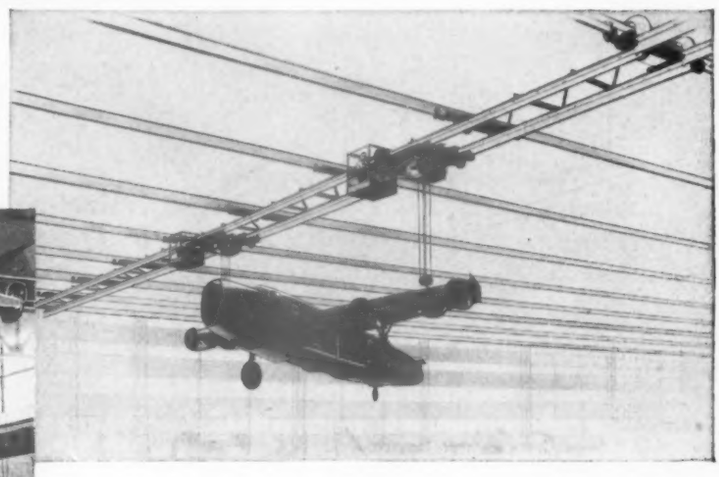
"Pon my word," Bill declared admiringly, "I believe you have all the makings of a first class crook. Unfortunately, my acquaintance with the profession is rather limited, but I presume they are classified as first, second and third class according to skill, experience and possibly seniority. The first class lads take away the stuff in big gobs. The second class boys confine themselves to small amounts where no risk is involved. The third class fellas make a severe dent in the Tenth Commandment by coveting their neighbor's goods, but lack the necessary courage to do any actual grabbing. If it comes to an actual showdown,"

(*Continued on page* 238)

To finish the job they gave him a few light taps under the steam hammer to squeeze out the water

Flexible Handling with MonoRail Cranes

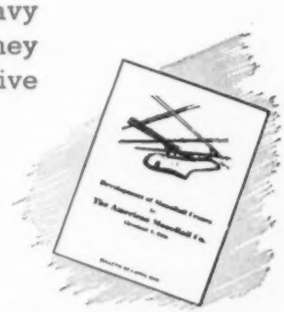




American MonoRail Cranes are not limited to bridging a single span. With their special interlocking and twin bridge designs, they supply over-all coverage . . . your handling is not tied down to alleyways or spotting or unloading near permanent equipment.

American MonoRail Cranes are available for any type of job — heavy or light duty — full automatic, cab controlled or hand operated. They can be installed under present operating conditions without excessive structural changes.

GET A COPY OF THIS BOOKLET! It tells the complete story of monorail crane development. Learn how cranes have been adapted to all kinds of handling operations. Ask for Bulletin MF-1.



THE AMERICAN MONORAIL COMPANY

13104 ATHENS AVENUE CLEVELAND 7, OHIO

. . . *That's right* . . . here's how you can answer your flask shakeout problems.

You'll find you can save manhours, increase foundry output, and lower flask maintenance with a Robins Floatex Shakeout—"Job-Engineered" to your specific production needs.

Every inch of the Floatex deck area is literally alive. This insures that, whether the flask is large or small, castings will be freed quickly, easily, and economically.

The Floatex illustrated is the world's biggest . . . but even when it bounces 75 tons, there is no vibration in the building. Floatex is designed to shake the flask, not the building.

To get the best answer to your own foundry production problems, write or call Robins. A "Job-Engineer" will come to your desk to provide a quick, accurate solution without cost or obligation to you.

Robins Floatex Shakeouts are made in Portable models for loaded flasks weighing up to 17 tons; in Standard models, up to 100 tons or more—non-discharging and self-discharging types; with and without flask loaders.

ROBINS
CONVEYORS INCORPORATED
PASSAIC, NEW JERSEY
Division of Hewitt Rubber Corporation

AMERICA'S ONLY COMPLETE MATERIALS HANDLING SERVICE

Hewitt and Robins unite to offer you 136 years of combined experience in "Job-Engineered" rubber products and machinery designed to answer every materials handling problem you have.

(*Continued from page* 236)

he generously admitted, "most of us would make a sorry showing on a truthful personality chart. I was reminded of this the other day while reading a letter from a man who has been a friend of mine since we were boys. He was retired recently on pension, but with a physique like that of Tarzan he probably will live to be at least one hundred. You know, molders never die. They live to an incredible age and then vanish. The letter was devoted principally to raking up incidents touching on the ageold and usually silent antagonism existing between the toilers, the hewers of wood and drawers of water, and those who by a special dispensation of Divine Providence, occupy supervisory positions. The parties of the first part would not go so far as the laying on of violent hands, but they heartily enjoyed anything that caused parties of the second part mental embarrassment or actual bodily pain."

"I know," I said, "I know. East is east and west is west and all that kind of stuff. What about this genial friend of yours who lived in the hope that the boss would break a leg or fall into an open-hearth cinder pit?"

"Ease off on the main sheet and stand by to let go the halliards. We'll make the dock on the next leg, just about the time I finish reading this letter."

DEAR FRIEND: I suppose you wonder what I am doing here in Providence, R. I. Well, Bill, you know I am retired now on pension so I have all the time in the world and can do as I please. I kind of figured this year I would go to the convention in Cleveland, but the Missus had her heart set on a trip to Providence, R. I. so we compromised, or whatever you call it and here we are in Providence, R. I. Quite a town and nice people after you get used to their funny accent.

I ran into Jimmy Rock one day. You remember Jimmy (Puggy) Rock. Served his time in Builders with Frank McGrail and other gay young hellions who afterward traveled all over the country in side door pullmans. Do you remember the time in the old shop down home when a few of these lads tried to drown the master mechanic? Just because he developed the habit of popping unexpectedly into the shops to see if any of the gang was idle. He loved to bawl the living daylights out of a victim. Through constant practice and a natural gift he was a past master in the art of applying the verbal whip.

A big hole was dug in the floor of the blacksmith shop close to the door to take the concrete foundation for a new steam hammer. Through a combination of delay, a leaky roof and a rainstorm, the hole was filled with water. Some person or persons unknown covered the surface with ashes and soot so that it resembled the remainder of the floor. Simon Legree popped in through the door and plopped right into water over his head. The boys had a delightful time nip-

(*Continued on page* 240)

REVOLVING MILL CONVEYORS

For All Foundries with Melting Facilities for Continuous Pour

ROTO-CAST

Increases mold production . . . saves labor . . . reduces handling time . . . Speeds output . . . Comes ready for quick, easy installation . . . !

*

3 Sizes

ROTO-CAST is made in three standard sizes: 10-ft., 12-ft., and 14-ft. diameters.

Full roller-bearing construction for easy turning. When desired, release of ratchet makes free-wheeling. Can be rotated with one finger even when fully loaded. No motors or other operating cost.

*

* Designed by foundrymen under actual working conditions, ROTO-CAST conveyors are in use in representative foundries . . . have proven their unusual merit and efficiency.

Easy to assemble and install, the unit sets on the floor without the necessity of anchoring, thus giving full flexibility. It is placed just back of each molder who simply turns around, places his mold on the conveyor, then steps on a trip ratchet release . . . spring arrangement revolving ROTO-CAST to position for receiving the next mold.

Pouring may be done from one spot as the unit is revolved and stopped positively for the pour. Shake-out is at one spot with molds simply picked off and dumped as machine is revolved. Its low cost will surprise you.

WRITE FOR FOLDER "F" FOR FURTHER DETAILS

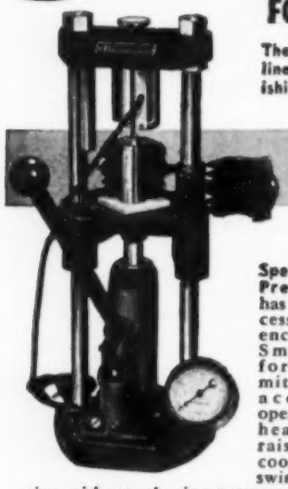
ROTO-CAST *Foundry Equipment, Inc.*

COLDWATER, MICHIGAN, U. S. A.

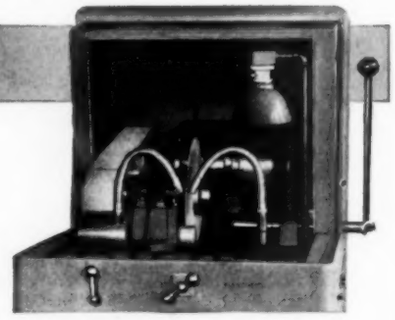
Buehler

SPECIMEN PREPARATION EQUIPMENT AND SUPPLIES FOR THE METALLURGICAL LABORATORY

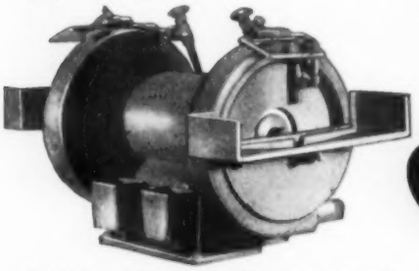
The items illustrated are selected from the complete Buehler line of equipment, tools and accessories for molding and finishing specimen mounts.



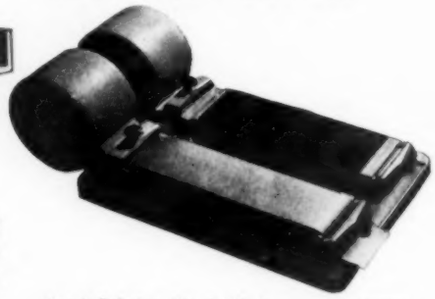
Specimen Mount Press No. 1315 has complete accessibility, no enclosed parts. Smooth performance permits speed and accuracy in operation. Solid heater can be raised and the cooling blocks swing into position without releasing pressure on the mold. This rapid cooling permits production of transoptic mounts in a few minutes. Shipping weight, 100 lbs.



Abrasive Cut-off Machine, Model No. 1000, is a solidly built, heavy duty piece of equipment free from sideplay or vibration with capacity for cutting specimen sections up to 3-1/2". Cutting is done on the front of the wheel and is controlled by a convenient outside lever. The driving motor is a totally enclosed ball bearing, 3 hp. with a separate motor driving the self-contained cooling system. Overall dimensions of cabinet 31" x 47" x 64". Shipping weight, 1400 lbs.



Wet Power Grinder No. 1210, powered with a 3/4 hp. totally enclosed ball bearing motor has two 12" water cooled wheels fitted with closed-in guards and non-shatterable shields. Suitable for coarse and medium grinding. Shipping weight, 310 lbs.



Hand Grinder No. 1410 is a most conveniently arranged two stage grinder. The grinding surfaces are 4-1/2" x 12-1/4" each with heavy 7/16" thick plate glass back. A reserve roll of 150 feet of emery paper is contained in drums for quick renewal of grinding surface. Base has gutter drains for surplus liquid in wet grinding operations. Shipping weight, 95 lbs.

Standard Polisher No. 1500. A complete unit with direct mounted ¼ hp. radial thrust ball bearing motor. The 8" polishing disc is attached to a tapered arbor on the motor shaft by means of a stout sleeve. This sturdy construction and unusually smooth vibrationless operation helps to prevent pitting and amorphous film in polishing. The removable splash ring forms a convenient hand rest that aids the operator in precision work. A handy control lever on the mounted switch gives selective speeds of 575 and 1150 r.p.m. Shipping weight, 100 lbs.

Low Speed Polisher No. 1505-2, is particularly adapted to final stage polishing and for non-ferrous metal samples. The 8" disc is attached to a countershaft by a tapered sleeve with a long span between bearings, a construction feature that assures smooth operation. The selective speeds of 150 and 250 r.p.m. make this polisher perfectly adapted to the wax lap or lead lap polishing technique. Shipping weight, 105 lbs.

Either the standard or low speed polishers can be furnished in a single unit table model polisher No. 1516. A three unit table model No. 1540 is also available for maximum convenience in three stage polishing.

In the complete line of Buehler accessories and supplies for the metallurgical laboratory are found: Abrasive paper sheets, discs, and rolls in every grade • polishing solutions • polishing cloths • cut-off wheels and molding powders. Buehler service includes everything needed for preparing precision specimens from metallurgical samples, available from one reliable source.

Buehler Ltd.
A PARTNERSHIP

METALLURGICAL APPARATUS
165 West Wacker Drive, Chicago 1, Illinois

(*Continued from page* 238)

ping him shrewdly here and there with long handle tongs while dragging him out of the drink.

"There," said Bill, "is an example of one of the many features that complicate the probem of maintaining harmonious relations between what was known at one time as the upper five and the lower ten. Since we still have a few minutes I shall read you a recent communication from an ambitious molder who is contemplating the operation of a small nonferrous foundry, either as a whole, or part time enterprise. In a small shop set up in his home he has made a number of aluminum grave markers with names, dates, etc., cast on the face. He is thinking now of setting up and equipping a shop for making bronze markers, plaques and other miscellaneous castings. He says he would appreciate information on a natural draft coke fired furnace; al-

Willing to try anything once

so the proper price to charge for the castings. I wrote him as follows:

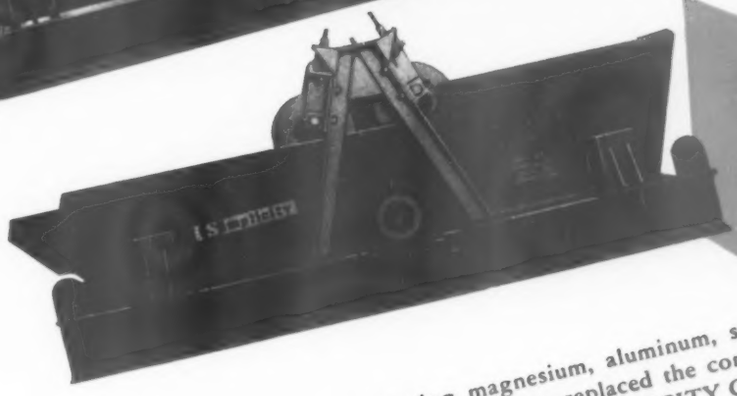
"Since you do not ask for an opinion on the probable success of the venture we shall not offer any comment except to say that you will do well to carry the left hand foot of a graveyard rabbit in each hind pocket. In the good old days, now happily gone forever, when a man retired to the woods and built an improved type mouse trap, an eager multitude of buyers beat a pathway to his door. In these modern days with inventors popping out of every bush, and pirates waiting to grab off what they can, the crowds rush past the door and jam the 5 and 10-cent stores where they can buy the familiar little red disks for a nickel each.

"We cannot offer proper advice on the price to charge, since that depends on local conditions. Basically, if the business is to continue, the selling price is equal

(*Continued on page* 242)

PROVEN in operation!...

SIMPLICITY Plate Type, gyrating screen and crushing unit. Used to handle lumps up to 30" in size.



SIMPLICITY Ring Type crusher and gyrating screen unit. Reduces lumps up to 4" in size to grain size.

Many modern foundries producing magnesium, aluminum, steel, malleable iron and gray iron castings, have replaced the conventional type crushers with these highly efficient SIMPLICITY Gyrating Screen and Crushing Unit combinations. These units have been proven successful in foundry operations, involving both core and molding sand, for several reasons. One unit does both crushing and screening and space requirements are little more than that needed for a screen alone. Positive crushing action is attained and the additional power for crushing is very small compared to the power required to operate the conventional type of crusher. Great economy is achieved due to extremely low maintenance costs and easy replacement of wearing parts. Write us now for full information regarding these modern, efficient and space-saving crushing units.

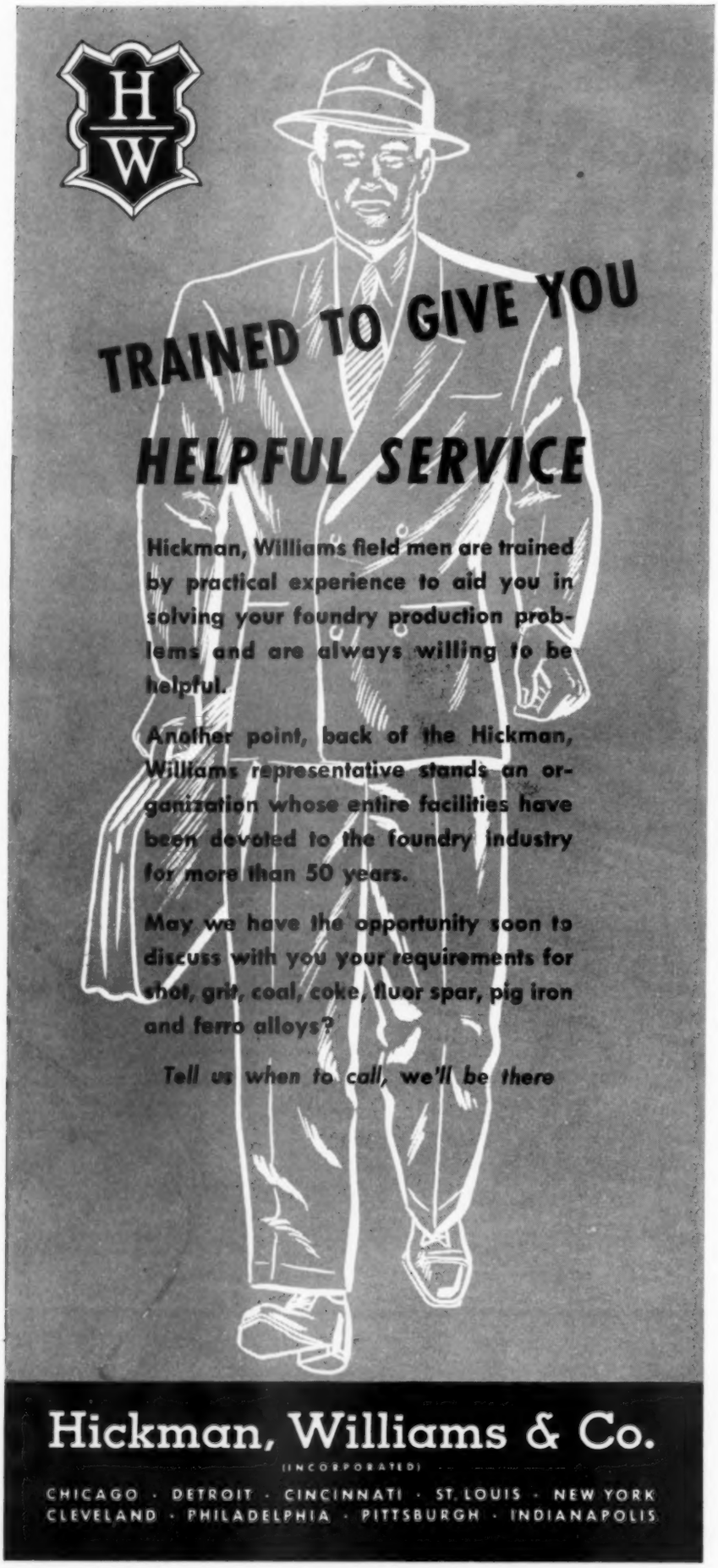
MEMBER

Simplicity

TRADE MARK REGISTERED

ENGINEERING COMPANY

DURAND, MICHIGAN


H
W
TRAINED TO GIVE YOU
HELPFUL SERVICE
Hickman, Williams field men are trained by practical experience to aid you in solving your foundry production problems and are always willing to be helpful.
Another point, back of the Hickman, Williams representative stands an organization whose entire facilities have been devoted to the foundry industry for more than 50 years.
May we have the opportunity soon to discuss with you your requirements for shot, grit, coal, coke, fluor spar, pig iron and ferro alloys?
Tell us when to call, we'll be there
Hickman, Williams & Co.
(INCORPORATED)
CHICAGO · DETROIT · CINCINNATI · ST. LOUIS · NEW YORK
CLEVELAND · PHILADELPHIA · PITTSBURGH · INDIANAPOLIS

(*Continued from page* 240)

to the cost of production, plus a reasonable profit. Presumably, as a molder you are familiar with the materials and equipment, but without former experience, you may overlook many items of expense that raise cost of operation to a remarkable extent. The temptation always is present to quote a lower price than that of a competitor. The result usually is that in a short time you and the competitor arrive together at the jumping off place. On the other hand, it must be admitted that many a small business started on a shoestring has developed into a pair of very large, very strong and very handsome shoes.

"Your letter is not clear on whether you propose to buy or build a furnace, or if you are seeking information on how to operate the furnace after it is installed. The ready made furnace is preferable to any homemade unit. In addition, the expert advice of the furnace builder is available on the size and capacity of the grate, flue and stack. There is a definite relationship between these items to insure maximum melting efficiency. Names and addresses of furnace makers are presented in every issue of THE FOUNDRY

"In the event you decide to build your own furnace, it may be either round or square. All modern furnaces are round, but many old-time foundrymen prefer a square furnace, principally because that shape permits the entrance of a greater volume of air through the grate. The shell of a round furnace may be a new piece of ¼-in. steel plate rolled into a ring, or it may be and usually is an old boiler, smokestack or other fabrication cut down to the required size. The square shell is made up of four pieces of steel or cast iron plate bolted together at the corners.

"The lining may be fire brick, special shapes or a monolithic refractory material rammed to shape around a former block. Height and diameter of the furnace depend on the size of the crucible. Knowing in advance the size of the crucible best adapted to pouring certain castings, the diameter of the shell and lining are sufficient to allow a space of at least 4 in. for fuel between crucible and lining. A fire brick standing on end on the center of the grate, or a special refractory shape 8 or 9 in. high serves as a support for the crucible and insures a proper fuel bed under it.

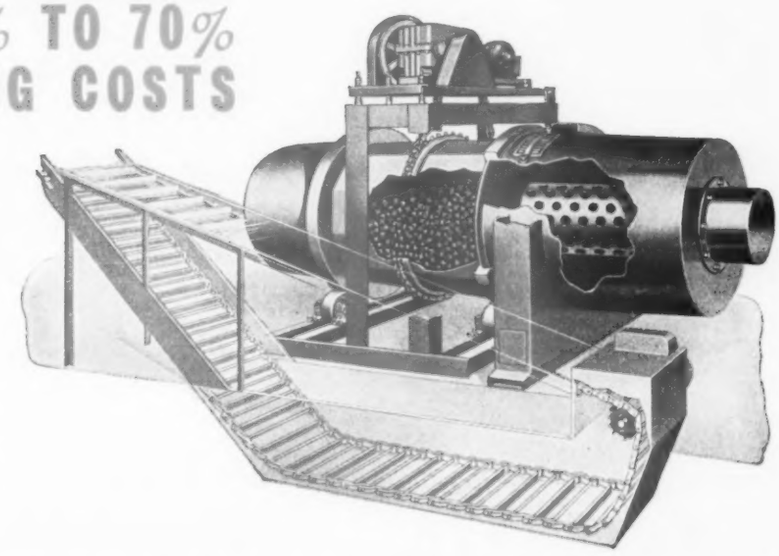
"Size of the flue between furnace and stack, also height, diameter and position inside or outside the building will have to conform with whatever local restrictions and rules are in force in the district. The insurance people also like to have a word or two where potential hazard from fire may be present. If the

(*Concluded on page* 244)

RANSOHOFF WET CLEANING MILLS
Automatic Star-Return

Two Types to Serve You Economically

AND SAVE YOU 30% TO 70% ON YOUR CLEANING COSTS



RANSOHOFF END-LOADING, END-UNLOADING MILLS

Loaded from conveyors or by power loaders. Equipped with patented discharge heads so that when rotated in one direction the tumbling medium is returned *automatically* to the tumbling compartment. When reversed, work is discharged *automatically* and tumbling medium is separated from the work. Castings and tumbling medium CASCADE AS A MASS WHICH PREVENTS NICKING, BREAKAGE AND EXCESSIVE MILL WEAR.

RANSOHOFF SIDE-LOADING, SIDE-UNLOADING MILLS

Load is placed in completely empty cleaning compartment, door is clamped shut and mill rotated in tumbling direction. Stars enter *automatically*. Because of the large number of stars which can be used cleaning time is about one-third of the average mill. STARS CHURN AGAINST THE WORK. NO PICKING STARS FROM CASTINGS IS NECESSARY AS STARS ARE SEPARATED AUTOMATICALLY.

Easy...gentle...speedy...not self-destructive . . . no health hazards...economical...stars are handled automatically

Send us a sample batch . . . we will make complete tests and render you a report, without obligation.

MEMBER

MANUFACTURERS ASSOCIATION INC. FOUNDRY EQUIPMENT

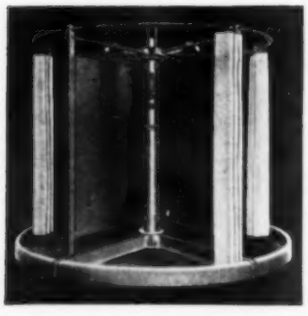
N. Ransohoff, Inc.

TOWNSHIP RD. AND BIG 4 RR. CINCINNATI 16, OHIO

BRADLEY MULTI-STALL SHOWERS

In plants where nature of the work subjects employees to grit, grime, metallic dust, or unusual extremes of heat—installations of showers, to complete the wash facilities, have helped decrease absenteeism due to dermatitis and have aided in the reduction of turnover by boosting morale and goodwill.

For these reasons, an increasing number of foundries, machine tool companies, and other industrial plants are modernizing their sanitary accommodations with Bradley Multi-Stall Showers.



The constant-temperature feature of Bradley Multi-Stall Showers minimizes scalding hazard.

One 5-Stall Unit requires only three supply lines—hot water, cold water, and drain, in comparison to 15 plumbing connections needed for five ordinary "single-stall" showers. Hot water costs are less and total water consumption reduced. Furthermore, five workers are served simultaneously, with no lost "waiting time."

Whether you are building a new plant, modernizing an existing structure or expanding present facilities, Bradley 5- or 3-Stall Shower Units, with Receptors, can be installed quickly and easily on any kind of floor including wood. BRADLEY WASHFOUNTAIN CO., 2217 W. Michigan St., Milwaukee 1, Wisconsin.

1946—25th Anniversary Year

BRADLEY *multi-stall showers*

Send today for Illustrated Catalog 4308 and helpful book of Washroom Layouts.

(*Concluded from page* 242)

proposed foundry is to be operated in a residential area, you may or may not encounter opposition. Without a distinct understanding in advance, property owners in the vicinity have been known to cause the foundryman acute embarrassment and painful financial loss by popping up with injunctions, torts, malfeasements and many other real and imaginary legal slings and arrows. We do not wish to discourage you in what appears to be a very commendable and laudable undertaking and certainly we wish you the best of luck. The man who travels the farthest on the tricky trail you are entering is the man who keeps eyes and ears wide open and mouth shut. And that is not a bad rule to follow under nearly all circumstances."

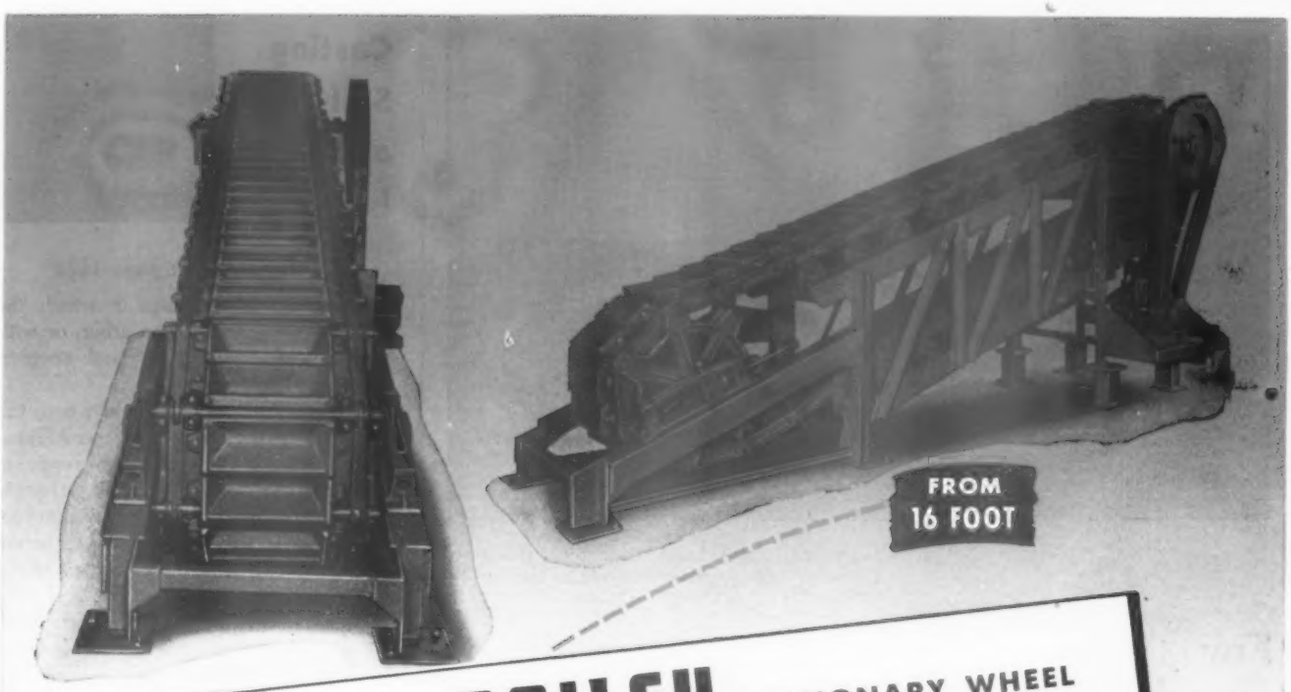
Gray Iron Regional Meetings Held

During April the first meetings of the newly-organized Regional groups of the Gray Iron Founders' Society Inc. were held in New York, Connecticut, Boston, Buffalo, Reading, Pittsburgh, Cincinnati, St. Louis, Chicago, Milwaukee, Detroit and Cleveland.

H. L. Edinger, president of the society, and W. W. Coutts, executive vice president, attended each meeting and outlined the present activities and future program of the society. Price control, manpower, and the society's cost program were topics of major interest. Mr. Edinger, who is also chairman of the Gray Iron Castings Industry Advisory Committee to OPA, pointed out that the financial survey conducted by the society last February had been of incalculable value to the entire industry, as it permitted the committee to present to the OPA the facts required for the granting of industry-wide price relief on gray iron castings.

Mr. Coutts, in discussing the present manpower situation, stated that a committee of society members had been formed to collaborate with the Veterans Administration Bureau to assist in improving the veterans training program in the gray iron industry.

Lengthy discussions were held on the subject of foundry costs, and meetings are to be held in Reading and Pittsburgh to organize additional cost groups in those areas which, with the addition of groups being organized on the West coast and in the South, will bring the number of cost groups sponsored by the society to 14. Meetings scheduled for June include St. Louis, Milwaukee, Cincinnati, Cleveland and Cedar Rapids. A wide range of subjects will be discussed at these meetings.



THE PATENTED **BAILEY** STATIONARY WHEEL

Pig Casting MACHINE

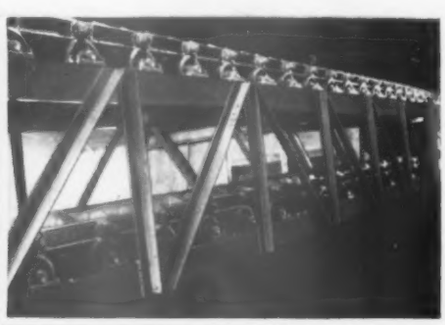
Eliminating traveling wheels—means eliminating *wear* and friction. Stationary, roller bearing idler wheels support the Bailey 15" link mold-chain, which cuts moving parts in half—with *only* one-fourth as many points of wear. Every feature of the patented Bailey Stationary Wheel Pig Casting Machine is designed to give maximum speed and flexibility in Casting, long, continuous, trouble-free service—under top speed operating conditions of 5 to 20 tons per hour.

Let Bailey Engineers work with you!

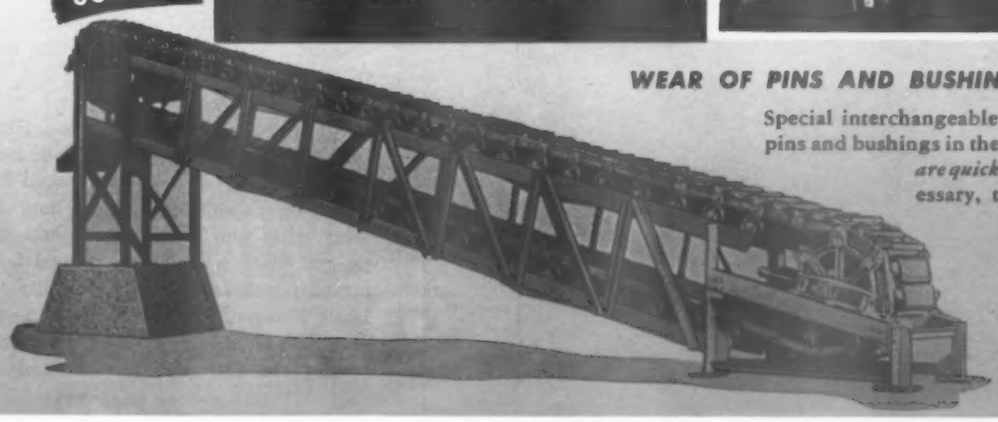
WILLIAM M. BAILEY COMPANY

Engineers

PITTSBURGH • PENNSYLVANIA

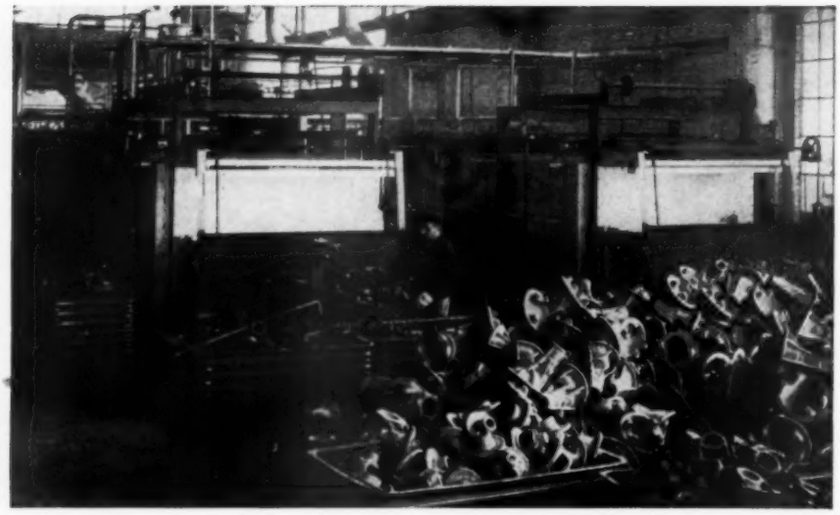


UP TO 60 FOOT



WEAR OF PINS AND BUSHINGS IS NEGLIGIBLE

Special interchangeable high manganese steel pins and bushings in the links take all the wear, *are quickly replaceable when* necessary, thus since there is no motion of links on the pins, except when the links are passing over the sprockets, friction and wear is actually negligible.



Scale-free, uniformly annealed castings are discharged continuously from the EF special atmosphere furnaces shown above.

For
Production Furnaces
For Handling Castings
or other products in
Any Size or Shape

FURNACES OIL, GAS or ELECTRIC
For Every Heating and Heat Treating Process

Aluminum Brazing
Annealing
Billet Heating
Bright Annealing
Bright Hardening
Copper Brazing
Controlled Atmosphere
Carburizing
Drawing
Enameling
Forging
Hardening
Malleablizing
Silver Soldering
Nitriding
Normalizing
Soaking Pits
Scale-Free Hardening
Quenching Machines
Ceramic Kilns, etc.
Process Heating

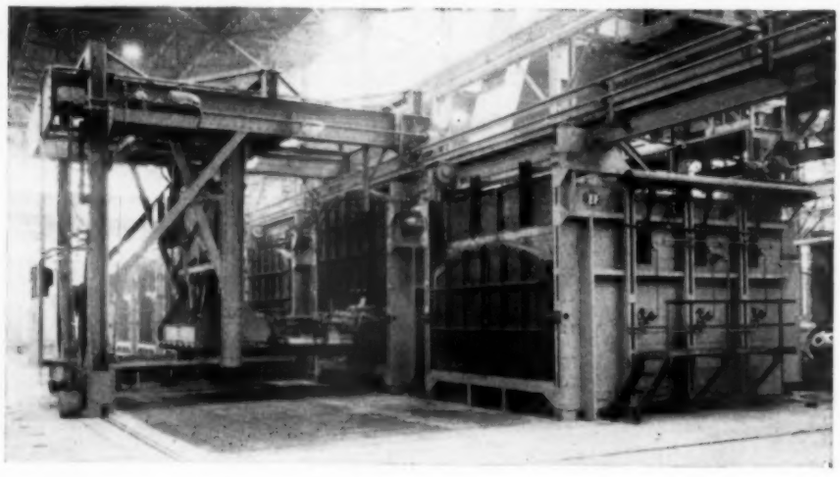
We Build the Furnace to Fit Your Job
THE ELECTRIC FURNACE CO.
SALEM, OHIO

For Production Furnaces, For Any Process or Production, Consult

The Electric Furnace Co., Salem, Ohio

No Job Is Too Large or Too Unusual

An installation of EF gas fired furnaces with quench and gantry crane for various annealing and heat treating cycles on large castings.



Casting Soil Pipe and Fittings

(*Continued from page* 112)

to short, chunky castings in which the core will stand without an arbor, or with an arbor of the plainest and simplest description.

In the second or *B* method where the molds are made on machines employing solid patterns, the cores are made in coreboxes and *booked.* The arbor is placed in the drag half of the corebox. Sand is packed by hand into both halves and scraped off flush with the edges. Both halves are raised to a vertical position until the sand faces touch each other. Then the assembly is lowered back on the bench with the drag half underneath. The cope half of the corebox is removed and the core is lifted out and placed in the mold.

Develop New Technique

The foregoing represents standard practice in foundries devoted to the production of soil pipe fittings castings. In the production of standard straight lengths Warden-King Ltd. has developed a technique which in many respects differs to a considerable extent from that usually employed. Machines, auxiliary equipment and methods designed to simplify and facilitate increased production were developed, constructed and installed by the engineering staff of the company. The unit includes two machines side by side for ramming the cope and drag, a transfer car, a coremaking machine which produces two cores at a time, a water tank for cooling the core arbors and a conveyor line on which the molds are poured in transit. Core arbors are seamless steel tubes approximately 7/8-in. less in diameter than the pipes. The term "approximately" is satisfactory for casual reference, but in actual practice the thickness of sand on the arbors is held to exceedingly close limits. A variation of 1/16-in. may mark the difference between success and failure.

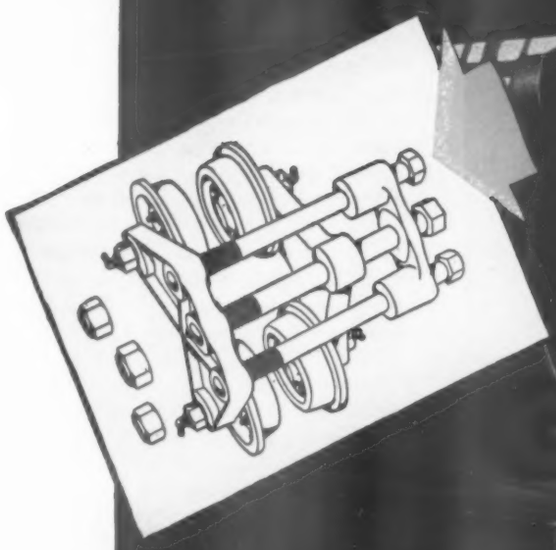
Patterns are electrically heated. Flasks are cast iron, with upper and lower flanges planed, with widely spaced bars extending down to the joint line, and with guide pin holes drilled through a jig and fitted with hardened steel bushings for uniform interchangeability. A small monorail hoist places the empty drag flask on the machined iron plate supporting the two pipe patterns and the

(*Continued on page* 248)

Don't overlook the MOVE factor in hoisting..

LIFT

LOWER



We've told you about the lifting and lowering features of our hoists, how the air motor is ideal for hot, gaseous atmosphere—the graduated throttle valve that gives instant and complete control—the automatic safety up-and down-stop—the automatic brake for holding loads, etc. But, we have taken one feature too much for granted and that has been our Articulated Type Trolley.

The trolley provides the MOVE in hoisting. If it is not a smoothly operating trolley, it can account for more than one headache and many minutes lost.

Briefly, here's what we want you to know about the I-R hoist trolley:

1—One bracket is rigid to stabilize the hoist and the other bracket is hinged, thus—
2—The load is always equalized on all four wheels.
3—The spherical wheel treads give one point contact for easy rolling and permit use on beams with flat or sloped flanges.
4—The trolley wheels have a hardened and ground tread and are fitted with—
5—High-grade ball bearings to provide smooth movement.

Our Industrial Air Motor Hoists are available in capacities from 300 to 20,000 pounds. Units can be furnished with a plain or hand-chain-driven trolley (both articulated) in place of the standard top hook. A four-wheel-drive, air-motor-driven trolley is also available.

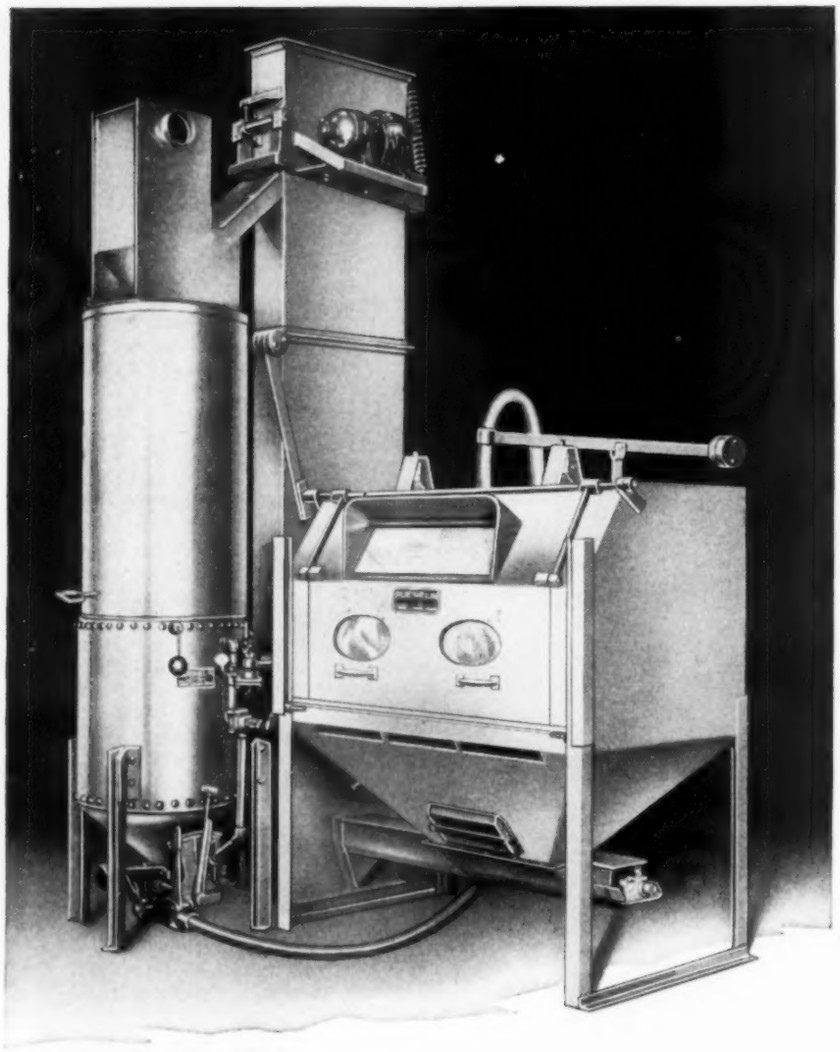
Write for full particulars on Ingersoll-Rand Air Hoists.

AIR TOOLS
COMPRESSORS
ROCK DRILLS
TURBO BLOWERS
CONDENSERS
CENTRIFUGAL PUMPS
OIL & GAS ENGINES

Ingersoll-Rand

11 BROADWAY, NEW YORK 4, N. Y.

8-833



Fast Cleaning
by **DIRECT PRESSURE BLAST!**

Ruemelin Blast Cabinet provides a fast cleaning action by direct pressure blast. Handles a great variety of jobs. Simple to operate. No skilled labor needed. Sanitary. Operator need not wear helmet. Front door loading. Saves footsteps and floor space. Low maintenance cost. No pits or foundation required. Shipped assembled for low installation cost. Handles all classes of abrasives. Over 1,000 in service in foundries, welding shops, steel treating plants, airplane factories, etc.

Write for Bulletin 32-B.

Also manufacturers of Welding Fume Collectors, Abrasive Handling Systems, Cloth Dust Filters, Blast Rooms, and accessories.

RUEMELIN MANUFACTURING COMPANY
3850 NORTH PALMER STREET MILWAUKEE 12, WIS., U. S. A.

RUEMELIN

SAND BLAST EQUIPMENT · TUBULAR DUST FILTERS

A 4397-⅝A

(*Continued from page* 246)

pattern for the gates, thin flat members spaced about 2 in. apart and extending almost the full length of the flask. The central runner is formed in the cope and terminates in an upright sprue at each end into which the metal is poured simultaneously from a ladle suspended from monorails. This feature differs from ordinary practice where the metal is poured into four sprues simultaneously, either from four single hand ladles, or from a bathtub type ladle with four lips on one side. Irrespective of the method of gating and pouring, high temperature and very fluid iron is required to fill the molds in which the metal thickness of the castings is approximately 3/16-in.

Operate Special Ramming Machine

After the flask is placed in position on the pattern plate, the height is increased by a wood frame 6 in. high, designed to hold the extra amount of sand required before it is compressed. A measured amount of sand is discharged by gravity from a chute directly under the distributing conveyor and storage hopper over the machine. The ramming mechanism then descends and squeezes the sand to the proper degree of density in the different areas of the mold. Travel of the ramming head up and down may be adjusted within definite limits. Mechanism of the head includes an eccentric shaft which actuates short vertical rammers terminating in wood blocks. The action closely parallels that of a molder's feet when he *tramps off* the sand in a mold. The wood pads are forced down in succession on the sand. The two operators remove the wood frame and then scrape the surplus sand from the top face of the flask. Small steel pins at the four corners lift the flask 3/4-in. Then a small hoist with beam and slings lifts the drag from the machine. While in transit it is turned over and placed on a small transfer car and pushed over a short distance in front of the cope making machine. Two attendants lift two green sand cores from the core-making machine in the vicinity and place them in the drag.

The cope, which has been rammed in a similar manner to that of the drag, is lifted from the machine and, without rolling over, is placed on the drag. The complete mold then is placed on a conveyor line, where groups of molds are poured in succession and at regular intervals. At the end of the conveyor line, the molds are shaken out. The core arbors are extracted immediately after the castings are poured. At this stage the sand is still green and has not baked onto the arbor. Castings are taken to the cleaning room and loaded in tumbling

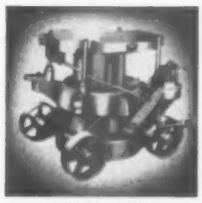
(*Continued on page* 250)

60 SIZES

DAVENPORT ★ MODERN MOLDING MACHINES

Jolt Rollover Draw, Model A

Jolt Rollover Draw, Model SA



Jolt Pin Lift, Model AJS (portable)

MODELS

Models A - Jolt Rollover Draw Molding Machines (6 sizes)
Models SA - Jolt Rollover Draw Molding Machines (6 sizes)
Models AJS - Jolt Pin Lift (portable) Molding Machines (1 size)
Models AJS - Jolt Pin Lift (stationary) Molding Machines (5 sizes)
Models 10-JX - Jolt Squeeze (portable) Molding Machines (1 size)
Models 10-JX-Jolt Squeeze (stationary) Molding Machines (1 size)
Models AJ - Plain Jolt (34 sizes)
Models RJ - Plain Jolt (6 sizes)

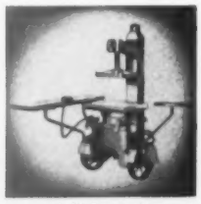
PRODUCTION or JOBBING FOUNDRIES

Davenport's wide range of models and sizes of modern molding machines will meet the most exacting requirements for production or jobbing foundries.

Let us send you our catalog so that you may become fully informed concerning the many outstanding features on Davenport molding machine equipment.

Jolt Pin Lift, Model AJS (stationary)

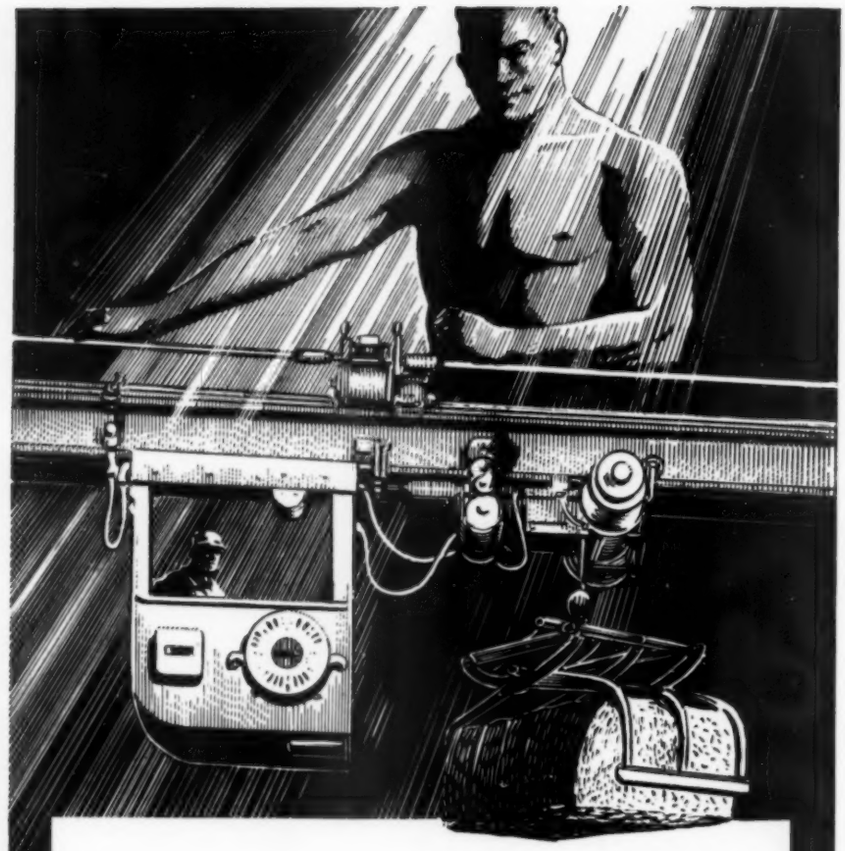
Jolt Squeeze, Model 10-JX (stationary)



Jolt Squeeze, Model 10-JX (portable)

DAVENPORT MACHINE AND *Foundry Company*

DAVENPORT IOWA



BUILT FOR TOUGH JOBS!

• The invisible strength of this mighty giant lifts and places heavy loads at your command.

The rugged construction of Shepard Niles Single Beam Cranes assures added handling economy resulting in extra value in terms of production economy. Shepard Niles Cranes are made tough and durable to give long, dependable service. They are made in many types, capacities and spans to fit your particular need.

To meet competitive production schedules — to maintain smooth-flowing production lines, material handling equipment must stand up under severe operating conditions. You'll get capacity load-handling, long efficient service at low maintenance cost with a Shepard Niles Hoist.

Shepard Niles
CRANE & HOIST CORPORATION

Improve your competitive position in the industrial world. A request will bring you full data and tell you how you can put a Shepard Niles Crane to efficient use in your factory.

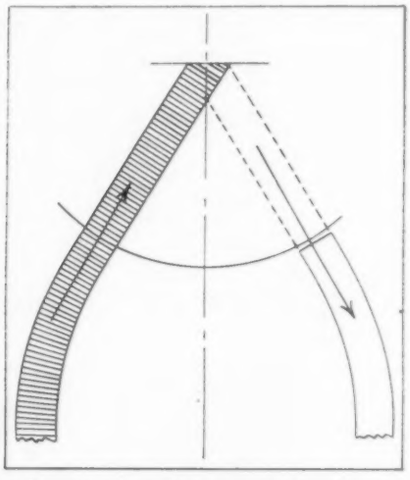
360 SCHUYLER AVE. • MONTOUR FALLS, N. Y.

(*Continued from page* 248)

barrels. Empty flasks are placed on a second conveyor line which carries them back to the molding station.

Core arbors are placed in one end of a long water tank and are moved gradually to the opposite end where a sprocket and chain elevator lifts them to a platform near the coremaking machine. Attendants place the arbors two at a time and side by side in a device which revolves them rapidly under streams of sand falling from an overhead hopper. Sand clings to the barrel and is contoured to the desired shape and size by a horizontal straight edge permanently attached to the machine. The resulting cores are perfectly round in cross section, straight, true and with a smooth surface that imparts a clean skin to the inside of the casting. Sand on the core arbors is the same as sand in the mold.

Each flask and core arbor makes the complete cycle from machine to conveyor, to pouring station, to shakeout and back to machine in 20 minutes. A total of 10 sets of flasks and forty arbors keep the unit in constant operation. At the shakeout end of the conveyor line the empty flasks are transferred to the return conveyor by an ingenious method and without the use of a crane. A section of roller conveyor is mounted on wheels at one end so that it may be swung through the arc of a circle to connect with either branch of the main line. While in the first position the empty flasks are pushed on from the shakeout. In the second position the empty flasks are pushed onto the conveyor which carries them back to the molding station.



Conveyor section serves two lines

Arbors for the plain straight pipes are enlarged at the bell end to equalize the thickness of sand. These arbors readily are extracted through the large

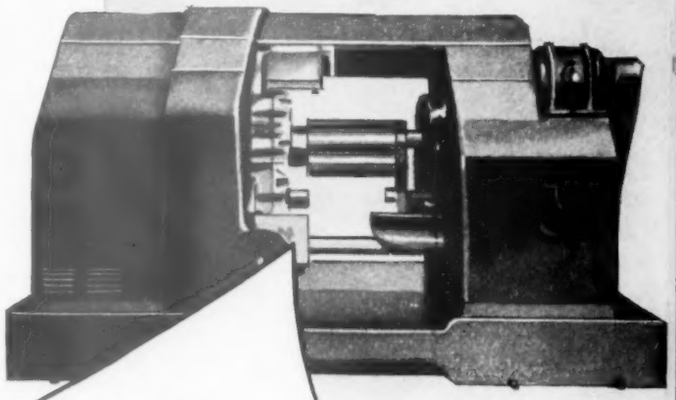
(*Continued on page* 257)

SPECIAL LATHE BUYS!

KEY	TYPE	SIZE OR CAPACITY	QUANTITY AVAILABLE NOW
A	Heavy Duty Mfg. and Prod. Multi-tool, not automatic	Up to 20" swing	788
B	Single Spindle, Horizontal, Platten type		63
C	Single Spindle, Horizontal, Turret type		280
D	Multi Spindle, Horizontal	4 to 8 Spindles	1,518
E	Multi Spindle, Vertical	6 to 8 Spindles	202
F	Auto. between centers chucking, horiz. single spindle	All sizes	2,036
G	Speed Lathes	1/6 to 5 HP	2,070
H	Turret Lathes	All sizes	140

D Multiple Spindle Horizontal Lathes

These 4, 5, 6 and 8 spindle machines or equivalent (see table) are located in Chicago, Cleveland, Detroit, Nashville and St. Louis offices of War Assets Administration. Ask any W. A. A. office.



GOVERNMENT-OWNED SURPLUS PRODUCTION EQUIPMENT

LATHES

An immediate source of additional or more modern production equipment is the large inventories held by the War Assets Administration. Built for war, basic machine tools such as these lathes are ready to serve in peace. Hundreds of items are available now, priced for quick sale. You can do yourself and America an important service by putting this idle production capacity to work as quickly as possible. Check this and the following three pages carefully and act at once to secure equipment you can use profitably.

A Heavy Duty Mfg. and Prod. Multi-tool Lathe (not automatic). These heavy duty production tools are available in quantity in Detroit, Chicago, Boston, and New Orleans offices of War Assets Administration. For details contact any W. A. A. office.

Veterans of World War II— To help you in purchasing surplus property, veterans' units have been established in each War Assets Administration Regional Office.

MAIL TODAY*

To War Assets Administration:

Please send me information on the types of lathes checked at the right. I am also interested in the availability of the following types of lathes not listed in this advertisement:

.....

.....

.....

Name.....Telephone No.....

Firm.....

Address.....

City.....State.....

**For War Assets Administration address, see 4th page of this advertisement.*

277-4

LATHE CHECK LIST

(These key letters correspond to the machines listed in the table above. Simply check those in which you are interested.)

A___ B___

C___ D___

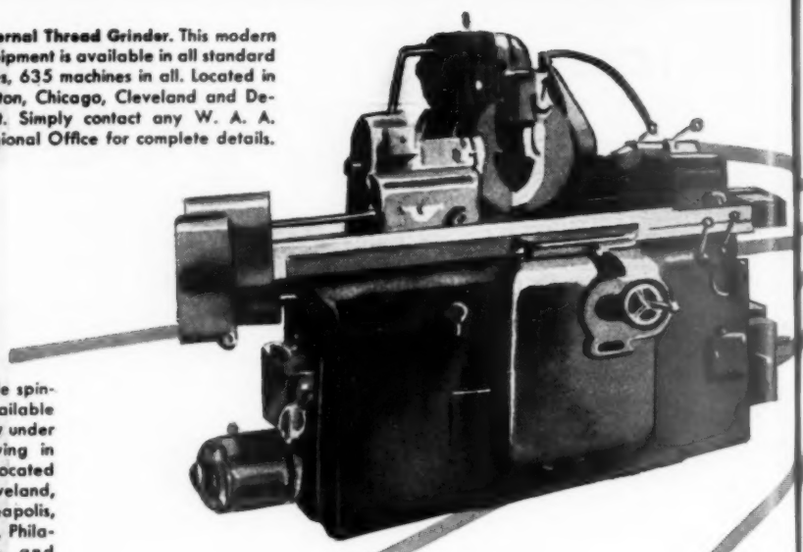
E___ F___

G___ H___

277-4

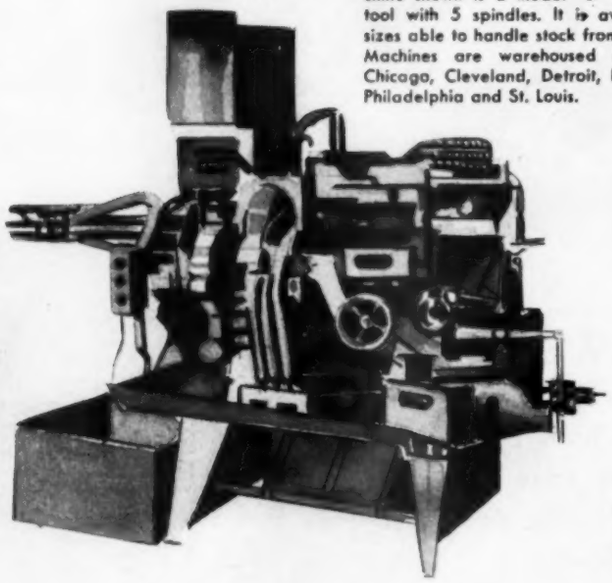
Bench Drill. Sensitive, single spindle, round column type; available up to 22" swing in capacity under ½"; from 16" to 24" swing in capacity from ½" to 1". Located in Boston, Birmingham, Cleveland, Charlotte, Detroit, Minneapolis, New York, Oklahoma City, Philadelphia, San Antonio and St. Louis Regional Offices.

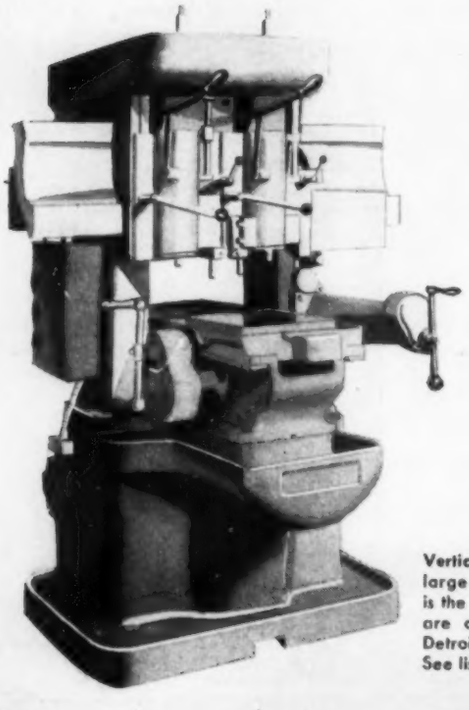
External Thread Grinder. This modern equipment is available in all standard sizes, 635 machines in all. Located in Boston, Chicago, Cleveland and Detroit. Simply contact any W. A. A. Regional Office for complete details.



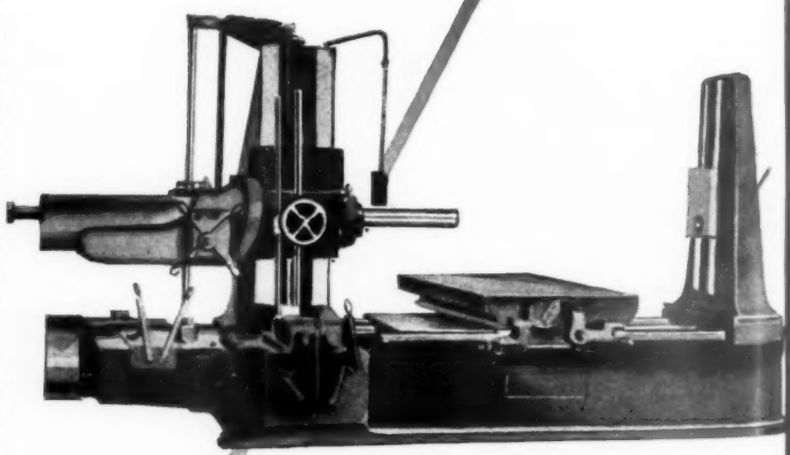
External Cylinder Grinder—Plain. This is a Norton model but other makes are also available. Total inventories in Boston, Chicago, Cleveland, Detroit, Philadelphia and St. Louis amount to 1730 machines.

Automatic Screw Machine-Bar. The machine shown is a model "B" Davenport tool with 5 spindles. It is available in sizes able to handle stock from 1" on up. Machines are warehoused in Boston, Chicago, Cleveland, Detroit, New York, Philadelphia and St. Louis.





Vertical Profiler—2 spindle type. Typical of a large number of 1, 2, 3, and 4 spindle machines is the milling machine shown here. These machines are available in Boston, Chicago, Cleveland, Detroit, New York and other Regional Offices. See list (next page) for other types also in stock.



Horizontal Boring, Drilling and Milling Machines. Here is another illustration of a machine typical of an entire class of machine tools available in large quantity at many W. A. A. Regional Offices, in standard makes and sizes.

BASIC TOOLS

GOVERNMENT-OWNED SURPLUS PRODUCTION EQUIPMENT

(second in a series of 4-page advertisements designed to inform industry of available machine tool surpluses)

Here, by the hundreds, are the tools you need to modernize your production and establish new enterprises—available *now* at low cost—at a time when a war-devastated world is exerting the biggest demand for goods and services ever known. You owe it to yourself, your organization, and your fellow men to put this productive capacity to immediate use. So check this list carefully. Find out which of these basic tools will help you solve immediate production problems. Then clip and mail the expediting coupon to the nearest War Assets Administration office listed on the next page. War Assets Administration is a government agency specially created to help you apply War Surpluses to post war needs.

CHECK LIST OF SPECIAL MACHINE TOOL BUYS!

Here are a few of the many thousands of machine tools now available through War Assets Administration.

KEY*	MACHINE (function)	TYPE	SIZE OR CAPACITY	Quantity Available Now
A—	Grinders	Race Radius—External		118
B—		Race Radius—Internal		72
C—		Contour Profile		75
D—	Screw Machine	Auto—Bar—Single Spindle	Up to 1½" cap.	1975
E—	Screw Machine	Auto—Bar—Five Spindles	All sizes	1515
F—	Screw Machine	Auto—Bar—Eight Spindles	1½" and Over cap.	380
G—	Engravers	Pantagraph—2 Dimensions		70
H—	Honers	Internal—Horizontal	Under 6" Bore	175
I—		Internal—Vertical		129
J—	Lapping	Flat Surface Only	24" Diam. lap plate	107
K—	Polishers & Buffers	Floor Type	½ to 10 H.P.	1479
L—	Lathes	Speed Type	Up to 3 H.P.	1490
M—	Saws	Circular Cut-off		250
N—	Abrasive Machine	Belt Drum & Disc		580
O—	Abrasive Cut-off			112
P—	Tapping	Vertical—1 & 2 Spindle		457
Q—	Tapping	Horizontal—1 Spindle		259
R—	Die Threading	Belt Rotary—1 Spindle		390
S—	Centering	Double End—Horizontal		112
T—	Pointing, Chamfering & Burring			141
ZZ—	Gear Shapers	External & Internal	Up to 40" Diam.	
PP—		Spur—External only		
QQ—		Spur & Helical—External & Inter		
RR—		Spur & Helical—External only		
SS—	Gear Cutters	Bevel Type not inc. Planer Type Str. B		
TT—	Gear Tooth Finisher	Generating Type Grinding		
UU—		Formed Wheel Type		
VV—	Gear Tooth Lapper	External only		
		Comb. External & Internal		
WW—	Gear Tooth Shaver	Rotary Type		
XX—	Grinder	External Cylinder—Plain		
U—	Shaver	(Not Gear)		104
V—	Reamer	(Not Rifle)		516
W—	Drawing Machine		100,000# and over	21
X—	Machinery & Equipment Allied to Primary Metal Forming Machine and Equipment	Pickling	All sizes	149
Y—	Straight Side Presses	Vertical—Single Action	5 to 100 Tons	165
Z—		Vertical—Double Action	5 to 100 Tons	111
AA—	Flame Cutting Machine			1631
BB—	Hardness Tester	Brinell—Portable & Power		200
CC—		Rockwell—Manual & Power		425
DD—	Inspection Machine	Magnetic (Magnaflux)		601
EE—	Balancing Machine	Static		93
FF—		Dynamic		67
GG—	Boring, Drilling & Milling	Horizontal	Under 3" to 6"	209
HH—	Boring & Turning Drills	Vertical	Under 36" to 120" Swing	683
II—	Boring Fixed Rail Tank Mill	Vertical		87
JJ—	Precision Boring Machines	Horizontal bridge—single end	Under 8" to 14"	486
KK—		Horizontal bridge—double end	Under 8" to 14"	226
LL—	Drills	Box column—single spindle	Under ½" Cap.	
MM—			Up to 22" Swing ½" to 1" Cap.	287
NN—			16" to 24" Swing	
OO—		Round column—single spindle	Under Swing	
		Spec. Kingsbury Way & Vertical	Up to 32" Swing	161 / 296 / 250

KEY letters are provided for your convenience in filling out the coupon to the right. They do not refer to any other listing of surplus property. If used in contacting War Assets Administration Regional Offices by letter, wire or phone, please refer to this advertisement.

EXPEDITING COUPON

Use this coupon to conserve your time. Circle by key letters the machines in the above group in which you are interested and mail to your nearest W. A. A. Regional Office.* We will determine in advance our stock situation on the machines and inform you quickly, without obligation.

To War Assets Administration*:
Do you have in surplus stocks the following circled machine tools? Where are they located? What is their condition?

A, B, C, D, E, F, G, H, I, J, K, L, M, N, O, P, Q, R, S, T, U, V, W, X, Y, Z, AA, BB, CC, DD, EE, FF, GG, HH, II, JJ, KK, LL, MM, NN, OO, PP, QQ, RR, SS, TT, UU, VV, WW, XX, ZZ.

I am also interested in the following machine tools not included in your list:.....

.....

.....

.....Tel. No.....

Name.....

Firm.....

Address.....State.....

City.....

277-4

*For War Assets Administration address, see 4th page of this advertisement.

All items shown on this and preceding three pages are offered subject to prior sale. This surplus property has previously been advertised and offered to prior claimants including Veterans of World War II.

MILLERS

A Horizontal Hand-Feed Millers

For this and all the machine tools shown in this advertisement, simply contact your nearest War Assets Administration Office listed below, using the coupon provided. That office will know that large inventories of this miller, for example, are available in Boston, Detroit, Kansas City, and New York and how to get one or more for you.

GOVERNMENT-OWNED SURPLUS PRODUCTION EQUIPMENT

These milling machines, and the other surplus machine tools shown on the preceding 3 pages, were productive enough and modern enough to win history's biggest war. They were versatile enough to turn out some of the most intricate weapons of all times. As they stand—some used and some unused—they are the largest untapped source of peacetime productivity and profits in the U. S. today. With them you can modernize and speed up your production or establish new enterprises at lowest cost. And it's easy to do. As a first step in acquiring these machines, simply fill in and mail the coupons on this or the preceding 3 pages.

B Horizontal Miller (knee type) *These machines are located in quantity as follows.*

#1; under 28" Table Travel; New York, Boston, Detroit. #2; 28" to 34" Table Travel; Detroit, Cleveland, Boston. #3; 34" to 42" Table Travel; Detroit, Cleveland, Chicago and Philadelphia. #4; 42" to 50" Table Travel; Detroit, Cleveland. #5; over 50" Table Travel; Detroit, Cleveland, Chicago.

FREE INFORMATION

To War Assets Administration:

Without obligation, please send me detailed information on the milling machines checked at the right and on the following types not included in your list:

.....

.....

.....

277-4

MILLER CHECK LIST

(These key letters correspond to the machines listed in the table above. Simply check those in which you are interested.)

A	E	I
B	F	J
C	G	K
D	H	L

Name.....

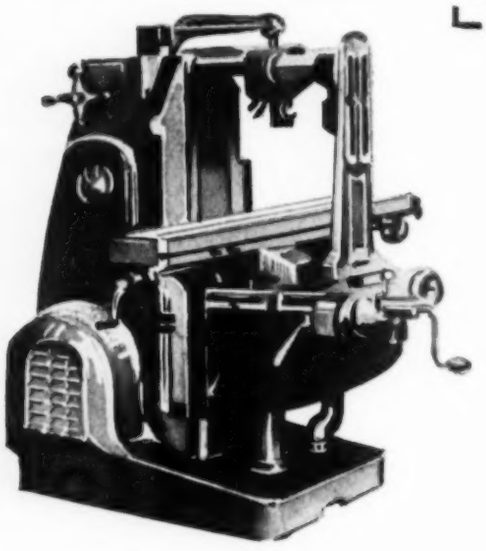
Tel. No.....

Firm.....

Address.....

City.....

State.....



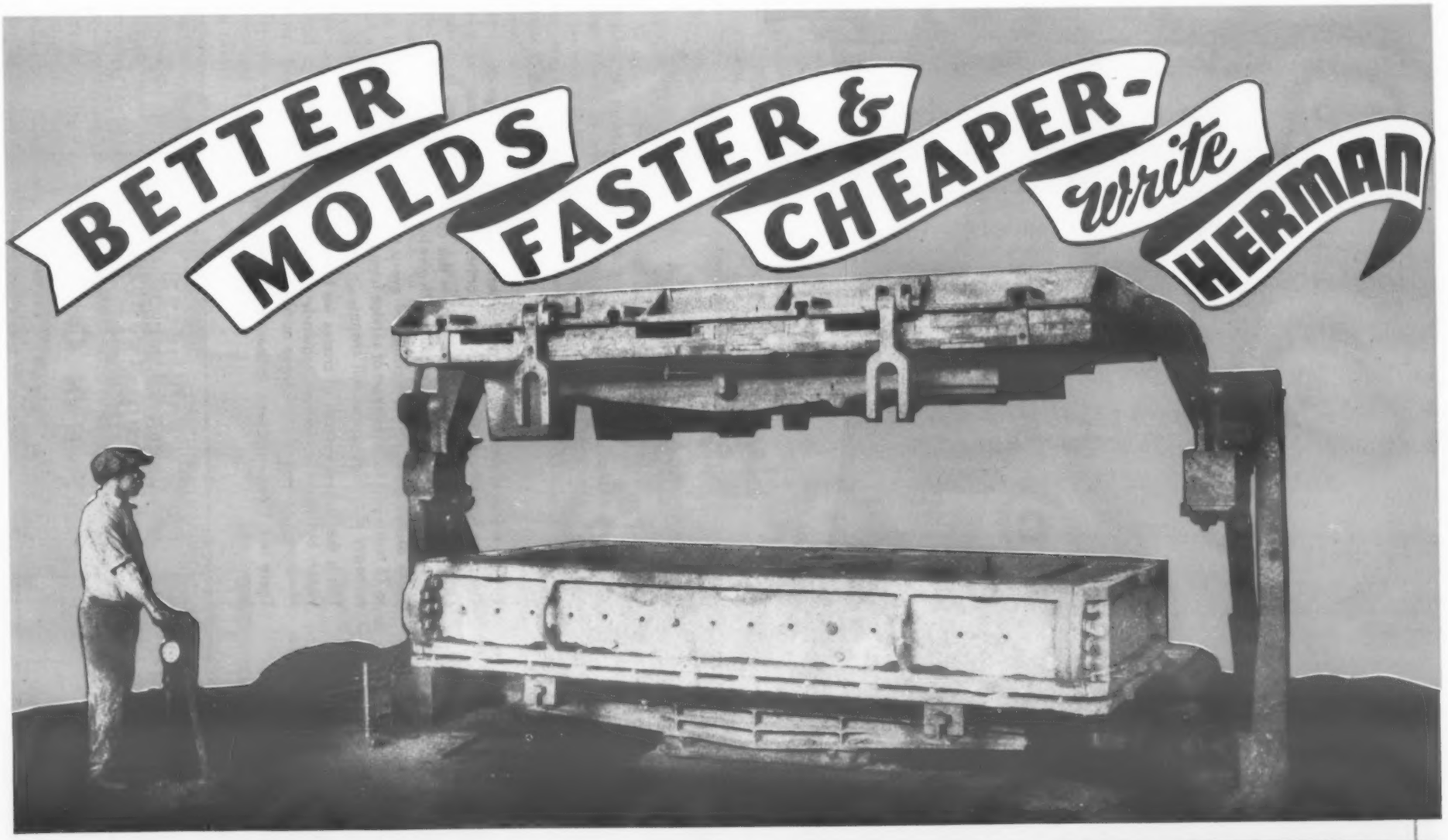
SPECIAL MILLING MACHINE BUYS!

KEY	TYPE	SIZE OR CAPACITY	QUANTITY AVAILABLE NOW
A	Horizontal, Plain, Hand Feed	All sizes	564
B	Horizontal, Plain, Knee Type	#1 to #5	2,125
C	Vertical, Universal	#1 to #5	847
D	Auto Millers	All sizes	455
E	Bed Type, Plain, Horiz. Spindle	All sizes	2,703
F	Vertical Spindle, standard	All sizes	428
G	Vertical Fixed Bed Profiler	1 and 2 Spindles	847
H	Thread Millers—Universal (non-auto)	12" Work Dia. and up.	76
I	Thread Millers—Universal (auto)	Up to 20"	238
J	Thread Millers—Chucking (auto)		207
K	Planetary Milling Machines	6" Work Dia. and up	206
L	Spline Millers		248

WAR ASSETS ADMINISTRATION

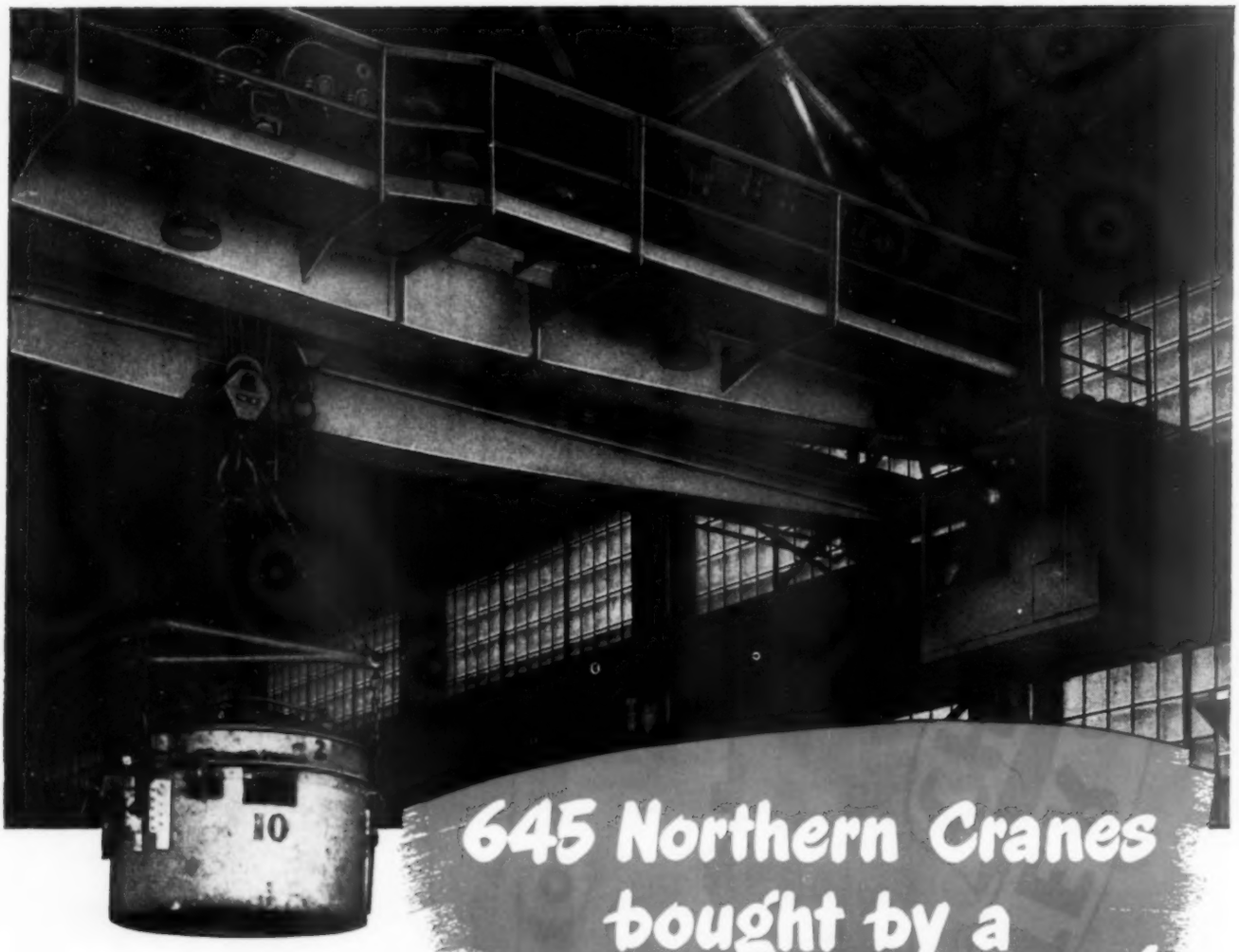
OFFICES LISTED BELOW ARE TEMPORARILY IN RECONSTRUCTION FINANCE CORPORATION AGENCIES

Offices located at: Atlanta • Birmingham • Boston • Charlotte • Chicago • Cleveland • Dallas • Denver • Detroit Helena • Houston • Jacksonville • Kansas City, Mo. • Little Rock • Los Angeles • Louisville • Minneapolis Nashville • New Orleans • New York • Oklahoma City • Omaha • Philadelphia • Portland, Ore. • Richmond St. Louis • Salt Lake City • San Antonio • San Francisco • Seattle • Spokane • Cincinnati • Fort Worth (Tel. 3-5381)

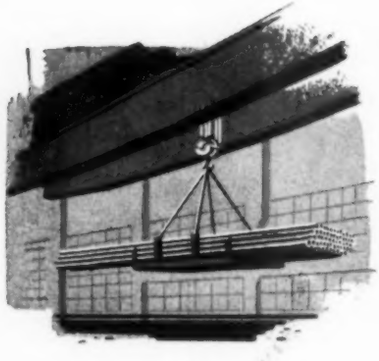


MOLDING **HERMAN** MACHINES

HERMAN PNEUMATIC MACHINE CO., UNION BANK BUILDING, PITTSBURGH, PA.



645 Northern Cranes bought by a SINGLE Customer!



Placing scores of repeat orders over a period of years, one large company has bought a total of 645 Northern Cranes.

Only one conclusion can be drawn from this continuous repeat business—Northern produces cranes which give lasting satisfaction.

These orders have included cranes of every type—capacities 5 to 75 tons—and for every sort of service from powerhouse cranes to heavy duty high speed mill cranes.

This is the largest number of cranes we have sold any one customer; but many companies regularly place repeat orders for Northern Cranes and have large numbers of them in operation.

There is a Northern Crane to meet your needs. Write for Bulletin 1 712.

WRITE FOR BULLETIN

NORTHERN ENGINEERING WORKS

2615 ATWATER STREET, DETROIT 7, MICHIGAN

Offices in Principal Cities

(*Continued from page 250*)

end of the castings at the shakeout station. For double bell end pipes a loose ring or collar is slipped over the end of the barrel and secured with a wood wedge. The wedge and collar are removed before the arbor is extracted from the casting.

In addition to the usual sand strip on the inside of the joint edge, the bars in the flasks employed for making boiler section castings are provided with sand strips which eliminate the use of gaggers. Small cast iron blocks, anchorage points for the chaplets, are integral with the bars and are machined accurately on the contact surfaces. Flask joints also are machined to a true plane. Lugs at each end, drilled accurately through a jig, locate the flasks on the machine and later locate the copes on the drags. Flasks are reinforced with flanges on the outside top and bottom.

Each boiler requires one front, one back and several intermediate sections. Installations vary according to local conditions and customer's specifications. The design is elastic. A boiler may be expanded or contracted to meet changes in operating conditions by adding or taking away one or more intermediate sections. Cast iron patterns split horizontally through the center and mounted on accurately machined plates, one for the cope and one for the drag, are provided for making the molds.

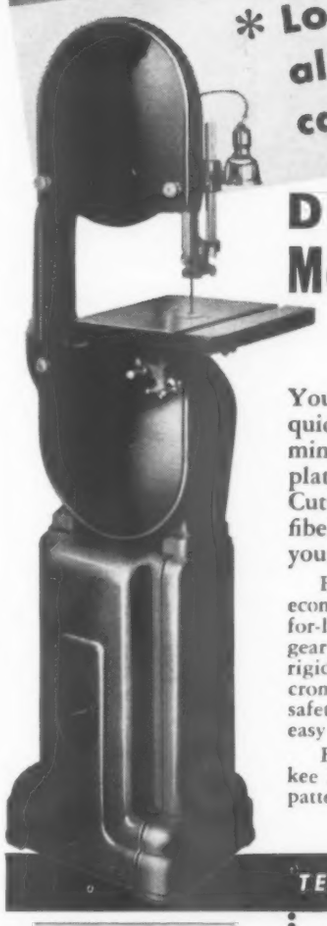
Core Prints Fit Tightly

All the vent from the large, flat core is taken off through three and, in some cases, two small holes in the cope. It is essential that the core prints carrying the vents should fit tightly into the core prints in the cope face of the mold. To insure this condition the short round pieces of core designed to form the holes are made separate from the remainder of the core and placed in the prints before the mold is closed. Gravity holds them in place in the drag, but in the cope it is necessary to apply paste and a few wires with flat toes, and then pinch and slick the sand around them. The metal is poured directly into the flared opening of a single sprue and enters the mold through a number of thin gates at the joint line. Facing sand containing a small amount of seacoal is sprinkled over the pattern. The remainder of the flask is filled with sand from the system.

Successful production of the cores presents many problems. They must be strong and rigid to withstand the handling involved in pasting the halves together, in placing them in the molds and in resisting the pressure of the molten iron. Many small openings are provided through the web to reduce the

One foundry reports savings of 60% on trimming costs, in trimming gates on castings — using a Delta-Milwaukee Metal-Cutting Band Saw.

* Low-cost sawing of almost anything from carbon steel to asbestos



DELTA-MILWAUKEE
Metal-Cutting Band Saw

Four metal-cutting speeds...
One wood-cutting speed . . .

Your Delta-Milwaukee Metal-Cutting Band Saw quickly pays for itself on many applications. Trimming gates in iron, brass, aluminum. Cutting templates. Sawing off tool, die, and fixture stock. Cutting almost any material — steel, plastics, mica, fiber, carbon, vulcanite, etc. Use it also for making your wood and metal patterns.

Famous Delta-Milwaukee construction features assure economical operation and long, trouble-free life: Lubricated-for-life New Departure ball bearings. Simple, foolproof gear drive. Massive table mounted on double trunnions for rigidity. Guides that can be independently adjusted to micrometer accuracy. Guide controls at front of table for safety. Completely guarded, safety-type wheels rimmed for easy tire renewal. Many other advantages that benefit you.

Enjoy the economy and versatility of the Delta-Milwaukee Metal-Cutting Band Saw. Install it in your foundry or pattern shop. See your Delta distributor.

Send coupon below for Bulletin No. A-28.

TEAR OUT COUPON AND MAIL TODAY!

DELTA
MILWAUKEE
REG. U.S. PAT. OFF.
Machine Tools

Subsidiary of Rockwell Manufacturing Co.

THE DELTA MANUFACTURING CO.
623F E. Vienna Avenue, Milwaukee 1, Wisconsin

Please send me Bulletin No. A-28 on Delta Metal-Cutting Band Saws.

Name.....Position.....
Company.....
Address.....
City.....(.....) State.....

WF-7

pressure and also to prevent the formation of cold shut streaks or areas over the wide expanse of flat surface. Since the iron at no place is over 3/8-in. thick it is apparent that the least blow or flutter from the core would be fatal. Use of rods or arbors to reinforce the core is limited by the fact that everything inside the casting must be removed through the three small openings referred to. Owing to the same limiting factor the amount of binder in the core must be so nicely proportioned that it will all burn out and leave the sand free to disintegrate and run out of the casting in the casting cleaning room.

In addition to the natural porosity of the sand, vent channels are provided in the body of the core with a number of 1/4-in. diameter rods. Some of the rods extend through opposite sides of the cast iron corebox. Others project through only one side. The inner ends terminate in small pins which fit in corresponding holes in the sides of long rods extending from side to side. The usual procedure in making the core is to shovel a thin coating of sand over the bottom of the corebox. A rod bent to the shape of the inside of the box is laid on the sand and several other rods are laid at strategic points between the natural divisions of the corebox to reinforce and strengthen the core. The vent rods are placed in proper position. The box is filled with sand, rammed and the joint struck off level with a long steel straightedge. After the plate is clamped in place the vent rods are removed, the core is rolled over and placed on the core oven rack.

After the castings reach the cleaning room they are mounted in pairs on a jolting vibrating screen set at an angle of approximately 60° from the perpendicular. Experiment has shown that this is about the steepest angle at which they will remain on the screen during the brief period the sand is running out of the two openings in the bottom legs.

A certain degree of skill and a deftness conducive to high speed, characterizes the actions of the coremakers who make the radiator cores. However, mechanical equipment has removed nearly all the hazard incident to this class of cores. Reference has been made to the manner in which a uniform grade of sand is assured. Cast iron coreboxes insure a practically unlimited production. Although the boxes are light enough to be handled readily, they are ribbed strongly on the outside to resist breakage and distortion. The corebox is placed side by side with a drier open side up on two steel bars that extend from side to side of each combined bench and sand container.

Venting Method Differs

The operator fills box and drier, presses the sand down with a section of steel plate, 5 x 10 x 1/2-in. thick and equipped with a handle in the center, and then scrapes all superfluous sand from the joint side of each half corebox with a short straightedge. Method of venting differs from that employed on the boiler section cores. A flat plate with suitable projections on one side is pressed down on the joint face of each half core to form a series of vent channels converging to one or two common points where openings in the casting provide a passage.

The coreboxes filled with sand are turned up on edge face to face and joined while in a vertical position. Suitable guide pins bring them into proper relationship with each other. The assembled box and core are lowered back to a horizontal position with the lower half or drier shell underneath. The upper half of the corebox is removed and the lower half containing the core is placed on the core rack. Cores remain in the oven 2½ hours at a temperature of 450 F and then are air cooled for 20 minutes before they are removed from the driers.

(To Be Concluded)

New Brush-Backed, Strip-Fed Abrasive Wheel Deburrs, Sands Any Surface!

For sanding in and around the most irregular contours —for deburring parts too large to be tumbled—for removing rust, paint and imperfections from wood, plastics, rubber, earthenware and metals—the new Sand-O-Flex brush-backed abrasive wheel is MOST PRACTICAL.

The central magazine houses a strip abrasive cartridge, to be fed out as needed in front of the eight brushes which "cushion" the abrasive, and force it evenly over the most difficult surfaces. The Sand-O-Flex comes in 3 sizes, and is adaptable to any stationary or portable motor shaft, with speeds up to 1750 RPM. Abrasives are available in grits for every need.

To help speed production in dry, dusty work atmosphere, many mills and factories urge workers to chew gum to help relieve dry throat. *The reason:* Because dust causes throat irritation and dryness—but chewing Wrigley's Spearmint gum helps keep workers' mouths moist and fresh. *The result:* Reduced work interruptions and "time outs" to the drinking fountain. Even when workers' hands are busy, they can refresh as they work "on the job." And the chewing action helps keep workers alert and wide-awake.

You can get complete information from the Sand-O-Flex Corporation, 4373 Melrose Ave., Los Angeles 27, California

Abrasive Cartridge Shown Open

AA-73

It Will Pay YOU, too, to try...

THE New NORTON B-5 RESINOID WHEELS

GRAY IRON CASTINGS with PORTABLE GRINDER

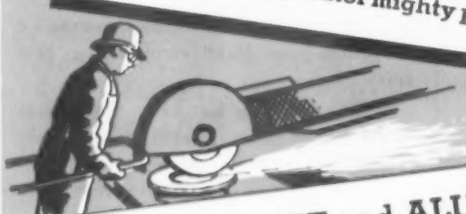
Wheel: 8" x 1" x 5/8" .. 37C14-Q4B5

"Fastest cutting wheel ever used ... have reordered several times"

STEEL CASTINGS with SWING FRAME GRINDER

Wheel: 24" x 3" x 12" 57A123-P4B5

"Cut 25% faster than any other wheel ever tried, and longer life. Grinding foreman and operator mighty pleased"



SOFT MALLEABLE CASTINGS on FLOOR STAND

Wheel: 24" x 2" x 12" A16-P4B5

"Very satisfactory—prefer over competing wheel—cuts faster and life O. K."

BRASS, BRONZE and ALUMINUM CASTINGS on FLOOR STAND

Wheel: 18" x 3" x 2" .. 37C16-P4B5 NO. 12 TREATED

"Best wheel ever used. Faster cutting, longer life, better finish than competing wheel"

STEEL CASTINGS on FLOOR STAND

Wheel: 30" x 3" x 12" A142-P4B5

"Produced twice the work and had nearly twice the life of competing wheel. Consider it most outstanding wheel they ever had in plant"

STEEL FORGINGS on DISC GRINDER

Wheel: 20" x 2 3/8" x 17" 57A46-K6B5

"Very satisfactory. Good finish and production with no burn"

A new catalog gives suggested specifications for B-5 wheels; also describes other Norton products for the foundry. Send for a copy today ... no obligation.

NORTON COMPANY, WORCESTER 6, MASS.

Distributors in All Principal Cities

W-1016

NORTON ABRASIVES

Improving the Gray Iron Foundry

(*Concluded from page* 108)

blowers has meant, in many cases, that new core box and drier equipment had to be provided, which was an expense to the customer, but also enabled him to get castings that could not have been made without the new equipment, due to the manpower shortage. While on this subject I would like to say that I believe we should all try to sell our customers on the practice of purchasing good pattern equipment. Far too many times we are asked to produce quality castings, with a low price tag, from pattern equipment that is either worn out or obsolete, and with few, or more likely no, core driers. There is a distinct loss of manpower when making castings from poor equipment. It pays the customer, as well as the foundry, to have good, modern pattern equipment.

Our cleaning department has shown a reduction of 4½ man-hours per ton of good castings with very little investment. All the castings are handled in wooden tote boxes, with a small $600 power lift truck. This truck moves the castings around the cleaning room, and hauls all of them to the machine shop or shipping department. One man does all of the hauling, with less effort than was required previously by three men with wheelbarrows and trucks. The cleaning department was rearranged on a production line basis to eliminate excessive hauling. Castings go from blast cabinet to grinder, to chippers, to inspectors, with a minimum of trucking. Proper lighting in this department has not only made it a more desirable place to work, but has enabled us to turn out a higher quality product.

We have recently put in operation a new cupola with mechanical charger. This installation should pay for itself in a maximum of three years, and some hot, hard, disagreeable jobs will thereby be eliminated. Previously it required approximately seven men per day to do our unloading and the charging of the cupola, while with the new setup we will be able to get this work done with only two men.

The following summarizes results of the three-year plant conditioning program:

1. The program has been the biggest contributing factor toward an excellent relationship between labor and management.
2. It has helped maintain an exceptionally high level of employment through the war period and this immediate postwar period.
3. Daily tonnage has increased from a 40 ton average to 55 tons.
4. A substantial reduction in scrap percentage and machine shop rejects.
5. A reduction of approximately 8 man-hours per ton of good castings.
6. Customer good will has been improved, not only through his receiving a higher quality product on time, but through the confidence he has gained in our organization by plant visitations.

This Stearns Lifting Magnet is giving a lift to production in a foundry operation.

Don't move this kind of material with laborious, time-consuming, inefficient and hazardous hand labor methods when a Stearns magnet will do it so much more economically.

For moving material quickly at low cost, saving hand labor on difficult and dangerous operations, increasing storage capacities—install a dependable, sturdy Stearns Magnet.

Write for our Bulletin 35.

STEARNS MAGNETIC MFG. CO.

MAGNETIC PULLEYS
SEPARATORS • CLUTCHES • BRAKES
662 So. 28th St. Milwaukee 4, Wis.

Device Calculates Casting Cost

National Engineering Co., Machinery Hall Bldg., Chicago 6, has prepared for free distribution a slide-rule type device, 3 3/4 x 10 in., which shows on one side a method for calculating the cost of castings per pound and on the other side total number of molds required, total amount of metal required and cubical content of molds. Separate tables are included to convert ounces into pounds, and weight of water into volume.

CORE OILS LOOK ALIKE . . . . . .

Three grades to choose from:

CERTIFIED GOLDEN CORE OILS, identified by their color, are made from the most select raw materials. Usually termed "Conventional core oils."

CERTIFIED UNIQUE CORE OILS give the same results as our Golden Core Oils, but are made from off-colored materials which are dark in color and cost much less.

CERTIFIED RAPIDRY CORE OILS, also dark in color, are considerably lower in price. They bake quicker in the oven or at a lower temperature and provide more readily collapsible cores.

BUT, OH, WHAT A DIFFERENCE IN THE RESULTS!

The difference is readily apparent in the finished cores. In most cases it is possible to identify cores made with Certified Core Oil by their smooth finish, firm edges and obviously "right" appearance.

But, the quality of Certified Core Oils goes much further than core appearance. When the grade prescribed by us is used, the following characteristics are provided:

(1) Proper grain coating
(2) Clean working in the boxes
(3) Minimum baking time
(4) Maximum core strength
(5) Easy shake-out
(6) Minimized gas and smoke
(7) Maximum ultimate economy
(8) Thoroughly dependable uniform quality

Uniform quality, so essential to the other results, is assured by laboratory control of production. The uniformity of Certified Core Oils is favored by a host of users.

You, too, will find an equally satisfactory core oil among the various grades in which the three general types of Certified Core Oil listed at the left are available.

Tell us the grade and number of the core oil you use, your type and mesh of sand, and your oven conditions. We will prescribe the ideal core oil for your class of work.

CORE OILS
SOCONY-VACUUM

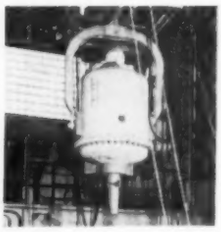
CERTIFIED CORE OIL DIVISION
SOCONY-VACUUM OIL COMPANY, INC.

3308-26 South Cicero Avenue, Cicero, Illinois.

Stock and representatives:

Buffalo, N. Y.; Elmira, N. Y.; Worcester, Mass.; Bloomfield, N. J.; Reading, Pa.; Sunbury, Ohio; Milwaukee, Wisc.; St. Louis, Mo.; Minneapolis, Minn.; Birmingham, Ala.; Houston, Tex.; Denver, Colo.; San Francisco, Calif.; Portland, Ore.

X-ray Checks Casting Quality



(*Concluded from page 95*)

and it can also be turned on trunnions, from a vertical to a horizontal position. Besides being readily manipulated, the unit is of simple, but rugged design, reliable in performance and free from exposed high voltages.

The unit is housed in an extension to the steel foundry, in a room 25 x 42 ft, with 24-in. monolithic concrete walls extending 7 ft below grade. Glass-block windows high on the walls furnish daylight in the room. A 24 in. wide concrete maze, with ¼-in. lead door, serves as entrance and exit. Leading out to the foundry is a 15 x 15 ft opening, closed by a hydraulically operated 50-ton concrete and steel door 18 in. thick. Work is brought in from the foundry on a 40-ton powered transfer car and handled inside with an 8-ton overhead crane. Castings too heavy for this crane are left on the cars during exposure, while the lighter pieces are placed on a revolving table near the track.

Adjacent to the x-ray room is the control room, 8 x 14 ft, which contains the main panel where the complete test control is set up. The timer controlling the length of exposure can be set for 1 min intervals, up to 55 min. When the preadjusted exposure time has elapsed the timer automatically breaks the interlock circuit.

An 11 x 18 ft dark room, equipped with sink, developing tanks, loading platform and film dryer, is located next to the control room. Entrance and exit to the dark room are gained through a light-proof maze. Developed plates are passed into the adjacent viewing room direct from the film dryer. The remainder of the building is used as office space. On the second floor is a film storage with room for about 100,000 negatives.

Elaborate precautions are taken to insure safe operation of the unit. Both doors leading to the exposure room must be closed, otherwise the machine is unable to operate. Before an exposure is made, a horn, which can be set to sound for 30 sec, gives warning in all rooms of the building, as well as in the adjacent section of the foundry, while a red light on the doors serves the same purpose during exposure. A master switch, properly marked, has also been provided in the x-ray room, making it possible to turn the power off at that point in emergencies. The foregoing satisfactory installation may serve as a guide for others.

There's a stock of

SCHUNDLER BENTONITE

near your plant

From any one of the locations shown below . . . you can get prompt shipments of Schundler Bentonite . . . a first quality foundry Bentonite.

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Birmingham, Ala	Foundry Service Co.
Boston, Mass	Klein-Farris Co., Inc.
Buffalo, N. Y.	Weaver Materiel Service
Chattanooga, Tenn.	Robbins Equipment Company
Chicago, Ill.	Foundry Supplies Co.
Chicago, Ill.	B. J. Steelman
Chicago, Ill.	Wehenn Abrasive Co.
Cincinnati, Ohio	Delhi Foundry Sand Co.
Coldwater, Mich.	The Foundries Materials Co.
Detroit, Mich.	The Foundries Materials Co.
Dallas, Texas	Barada & Page, Inc.
Edwardsville, Ill.	Midwest Foundry Supply Co.
Hammond, Ind.	The Foundries Materials Co.
Houston, Texas	Barada & Page, Inc.
Kansas City, Mo.	Barada & Page, Inc.
Long Island City, N.Y.	F. E. Schundler & Co., Inc.
Los Angeles, Calif.	Ind. Fdy. Supply Co.
Los Angeles, Calif.	F. E. Schundler Bentonite Co. (Inc. of California)
Milwaukee, Wis.	Thomas H. Gregg Co.
Minneapolis, Minn.	Smith-Sharpe Co.
Moline, Ill.	Marthens Company
New Orleans, La.	Barada & Page, Inc.
Oklahoma City, Okla.	Barada & Page, Inc.
Philadelphia, Pa.	Penna. Fdy. Sup. & Sand Co.
Portland, Ore.	Miller & Zehrung Chemical Co.
St. Louis, Mo.	Midwest Foundry Supply Co.
San Francisco, Calif.	Ind. Fdry. Supply Co.
Seattle, Wash.	Carl F. Miller Co.
Tulsa, Okla.	Barada & Page, Inc.
Wichita, Kans.	Barada & Page, Inc.
Mexico D. F., Mexico	N. S. Covacevich
Montreal, Quebec, Canada— (All Provinces)	Canadian Industries, Ltd.

F. E. SCHUNDLER & CO., INC.
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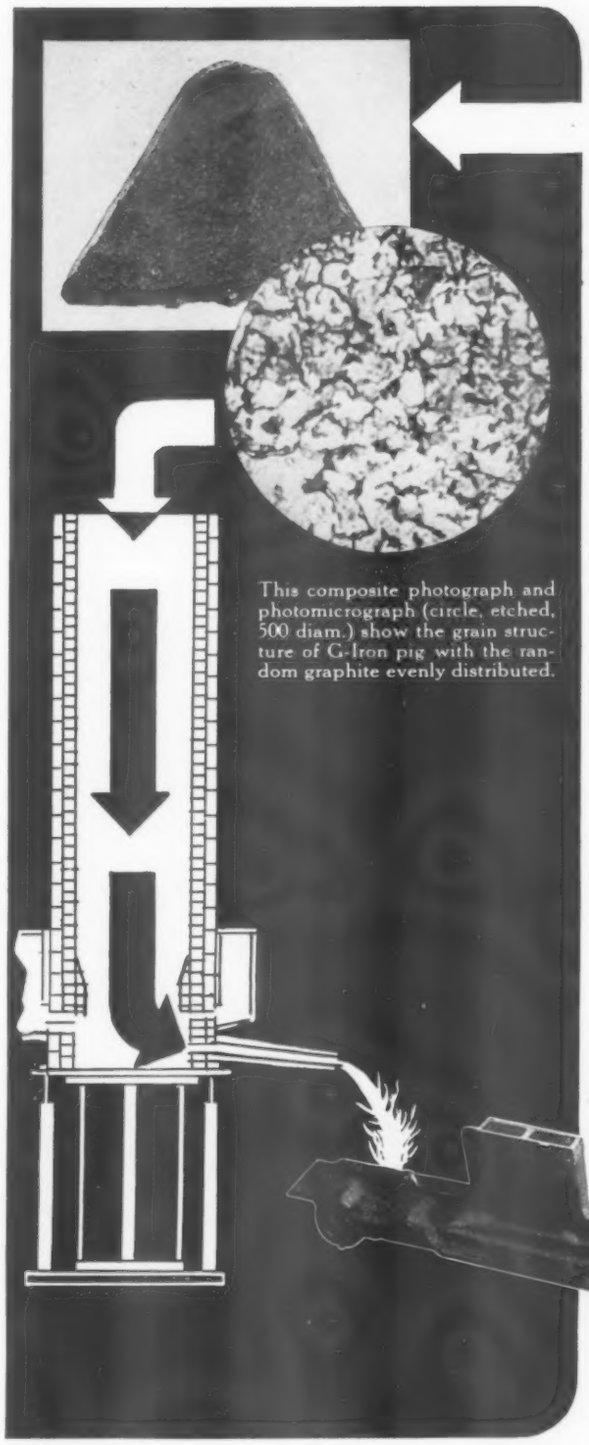
SCHUNDLER
BENTONITE

Gives Pointers on Plan Incentive

A special report compiled by the Labor Relations Institute, 1776 Broadway, New York, 19, N. Y., and titled *Practical Pointers on Incentive Plans,* now is available as a paper covered 35-page booklet at a price of $2.75 per copy. The introductory page directs attention to the fact that incentive systems are coming into favor again. However, the foundation for the success of any system is recognition of the fact that it must be well planned in advance. This report states that all the plans presented, all the advantages, all the dangers inherent in them, all the do's and don'ts are drawn from actual experience of the institute's management engineers. The concluding 13 pages are devoted to a detailed presentation of four basic methods of setting up and operating a wage incentive plan: The Taylor differential piece rate plan; the Halsey-Rowan gain sharing plan; The Gantt task and bonus system; and the Bedaux system.



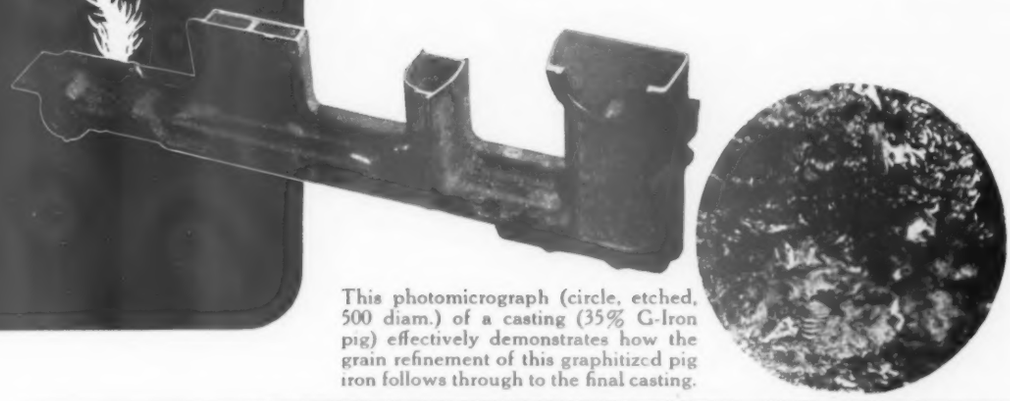
This composite photograph and photomicrograph (circle, etched, 500 diam.) show the grain structure of G-Iron pig with the random graphite evenly distributed.

See how the GRAIN REFINEMENT of G-IRON*

Pig "Follows Through" to the Casting

*G-IRON is graphitized pig iron. A patented blast furnace process refines the grain structure of the pig—*and this refinement follows through to the casting.*

The finely distributed graphite increases fluidity and reduces chill in thin sections—improves machinability and helps to overcome internal shrinkage and porosity between thin and heavy sections. Consequently, scrap losses are substantially reduced.



This photomicrograph (circle, etched, 500 diam.) of a casting (35% G-Iron pig) effectively demonstrates how the grain refinement of this graphitized pig iron follows through to the final casting.

TONAWANDA for sound castings

TONAWANDA IRON CORPORATION

NORTH TONAWANDA, N. Y.

Division of AMERICAN RADIATOR & Standard Sanitary CORPORATION

TEXAS CHAPTER MEETING

Attracts Large Crowd to Lufkin

By SARA DELL BINION
Lufkin Daily News

LUFKIN, nestled deep in the heart of the east Texas pine belt, pregnant with bustling foundries, roaring sawmills and a newsprint mill, opened wide its arms on Apr. 18 to pay special homage to the Texas Chapter of the American Foundrymen's Association.

It was an occasion marked by appearance of Robert LeTourneau, noted industrialist, who recently extended a tenacle of his far-reaching industrial empire to Longview, Tex.; an aggressive and long-applauded address by ex-congressman Martin Dies, now of Lufkin; and imminent predictions by the ever popular L. E. Roark, executive vice-president of the National Founders Association. It was a day characterized by good fellowship, exchange of ideas, and accomplishments for the approximately 600 members and guests of the Chapter who attended the affair.

Ramrodding activities was Ed Trout, Lufkin chairman of the Texas Chapter, who is associated with his illustrious father, W. C., in management and operation of the Lufkin Foundry & Machine Co. Ed presided at the LeTourneau "speaking" held at the Lufkin High School football stadium and at the night gathering at the Lufkin Country Club.

Several selections of Negro spirituals were rendered by the New Zion Gospel Choir at both the stadium and country club. A return engagement of Flat Foot, Mobile and his String Band was demanded by the Houston and Fort Worth crowd and the boys put on a great show. They did, however, miss those "millionaires" from Chicago who attended the meeting a year ago.

Besides the distinguished gathering of Texas foundrymen, iron and steel men from over the vast Southwest industrial area converged in Lufkin for the one-day session. Vanguard of delegates arrived early Thursday, taking opportunity to visit plants of the Southland Paper Mills Inc., the Lufkin Foundry & Machine Co., and the Texas Foundries Inc.

The meeting was pronounced as "one of the best in the association's recent history."

Mr. LeTourneau arrived in his private plane shortly before the public speaking at 5 p.m. Industrialists and civic leaders of Lufkin were on hand at the municipal airport to extend a cordial welcome to the visitor whose plants are scattered over the United States and abroad.

(*Continued on page* 266)

Top right—Ed P. Trout, vice president, Lufkin Foundry & Machine Co., and chairman of the Texas Chapter, who served as master of ceremonies at the Texas meeting. *Right center*—Ex-congressman Martin Dies, one of the principal speakers. *Bottom*—R. G. LeTourneau, Ed Trout, Pilot Jimmy Mathews, Wayne King and Bob Flannagan

Here final additions are being made to 5000 lbs. of quality steel just prior to pouring

EVERY OUNCE COUNTS

IN AN AJAX-NORTHRUP FURNACE

Loss of a few ounces of a constituent — even when melting 5000 lbs. — may make the difference between a good and a bad melt.

With Ajax-Northrup high-frequency melting, you can depend on precise composition, melt after melt. Melting is so fast (one ton of steel in one hour with 600 kw.) there is no time for oxidation. There are no carbon electrodes to contaminate.

Every ounce of final additions is distributed uniformly throughout the alloy. That's because the Ajax-Northrup stirs electromagnetically as it melts.

FOR GREATER FLEXIBILITY IN PRODUCTION:
Install a battery of Ajax-Northrup furnaces with different linings and capacities. You will have a furnace that is just right for efficient melting on any job. New furnaces can be added later on at low cost. Reconversion is no problem.

There are sizes of Ajax-Northrup furnaces that can handle your melting faster, more accurately, more economically. Capacities from 8 oz. to 8 tons. Ask for new bulletins on melting.

Send for informative Bulletin No. 25

85

AJAX NORTHRUP *Since 1916*

AJAX ELECTROTHERMIC CORP., AJAX PARK, TRENTON 5, N. J.

HIGH-FREQUENCY HEATING · MELTING

AJAX METAL COMPANY, Non-Ferrous Ingot Metals and Alloys for Foundry Use
AJAX ELECTRIC FURNACE CORP., Ajax-Wyatt Induction Furnaces for Melting
AJAX ELECTRIC CO., INC. The Ajax-Hultgren Electric Salt Bath Furnace
AJAX ENGINEERING CORP., Ajax-Tama-Wyatt Aluminum Melting Induction Furnaces

A S S O C I A T E C O M P A N I E S

(*Continued from page 264*)

Recently he moved into the vast Southwest area with establishment of the LeTourneau Technical Institute of Texas, located at Longview. Construction of a $5,000,000 plant is underway to turn out the novel Tournalayer, a machine which "lays" a concrete house. Nationwide publicity has been given the new industry.

Mr. LeTourneau, introduced by Mr. Roark, a lifelong friend of the executive, used as his topic for the afternoon address, "Values." He compared the difference between spiritual and material values, emphasizing that spiritual values should always come first in business and in everyday living. He reminded his audience that most citizens of today place material values foremost.

"Things sometime called value are worth the least," he declared. "Wealth is the product of labor, and things that have a value are the wealth of labor. Never did a person gain riches by sitting around, doing nothing. Labor is behind it."

More Developments Forthcoming

Mr. LeTourneau said there never was and never would be an over-production. He asserted that the case usually was under-consumption.

He predicted that there are more developments forthcoming by factories and plants and again remarked that labor was responsible for man's wealth and all those things most beneficial to mankind.

"I am no different from the rest of you people," he said. "My aim in life is to stay ahead of my competitor, but at the same time I can be God's business man, letting spiritual values come before material values."

At the 7 p.m. country club gathering, Mr. Roark, speaking to some foundrymen and guests, discussed supervision of labor.

"Now that the war is over and the laborer no longer is working to bring home his son and daughter from foreign lands, it is the job of the supervisor to see that his men will produce as they did during the war years.

"You did not make those men produce machinery during the war. . .his produc-

(*Concluded on page 268*)

Scenes at Lufkin meeting of Texas Chapter. *Top, left to right*—John Lloyd, W. E. Craner and Harry L. Wren of Houston. *Center, left to right*—Mrs. W. C. Trout, W. C. Trout, L. E. Roark, Col. Cal Chambers. *Bottom, left to right*—W. C. Trout, F. H. Wittlinger, R. G. LeTourneau, L. E. Roark

ENGINEERING ABILITY

DSM

BACKED BY 30 YEARS OF EXPERIENCE

DETROIT SHEET METAL WORKS
DETROIT, MICH. U.S.A.

EXPERIENCE and ability acquired in thousands of installations are at your service when selecting D. S. M. equipment.

D. S. M. case histories have been derived from equipment furnished to plants throughout U. S. A. and to Dagenham, England; Clichy, France; Bombay, India; Batavia, D. E. I.; Sao Paula, S. A.; Turin, Italy; etc. D. S. M. equipment means rapid cross flow circulation for speedy and uniform drying or baking. This eliminates case hardened products.

If you wish to convert your present system to the new postwar economy, it will be to your advantage to try our Go-Out Plan. This means that you will enjoy the services of our highly experienced engineers, who will personally inspect your system and work together with the various departments in your plant in need of special help. Their recommendations for whatever new installations may be required will place you in a position to secure a layout that will more than justify your outlay.

DETROIT SHEET METAL WORKS, 1270 OAKMAN BLVD., DETROIT 6, MICHIGAN

PLANT ENGINEERING: *Consulting assistance in plant layout to coordinate departmental operations, our experience dated from 1917 in this field.*

Such plant layout may be based on increasing production beyond present capacity, or it may be a rearrangement in this post-war period when operations are conducted under a new set of conditions.

MOTOR CLEANING EQUIPMENT: *Washing machines for cleaning tear-downs. Kerosene spray or similar solvent usually used as the cleaning medium.*

FORMED COWLINGS, PANELS, ETC.: *To your specifications, and of light metal alloys as required. Weldments and brazed assemblies may be under controlled atmosphere.*

PILOT EQUIPMENT: *Sample size equipment for development of heavy equipment.*

VERTICAL CORE BAKING OVENS • CONTINUOUS HORIZONTAL BAKING OVENS • BATCH TYPE CABINET OVENS • DRAWER OVENS

DETROIT SHEET METAL WORKS

DETROIT -6- MICHIGAN

(*Concluded from page 266*)

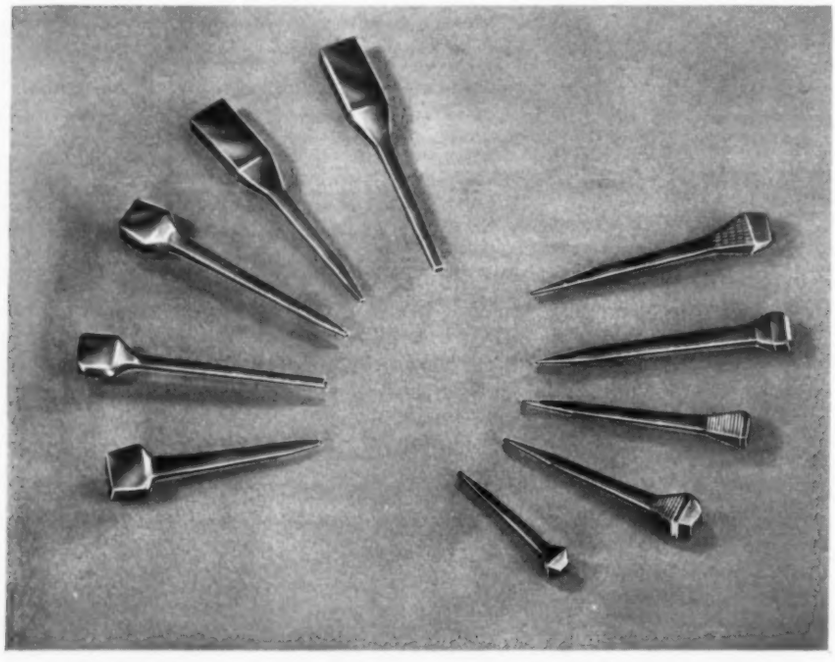
tion at that time was a result of an assault by foreign enemies upon our national structure. . .his boy was in uniform; his girl was in uniform."

Discussing a "production clinic," Mr. Roark said its objective was more production of better goods at "lower prices because the more produced, the more distributed."

"There are more developments in the making for present day machinery," was his prediction and belief.

Ex-congressman Dies, who gained nation-wide recognition as chairman of the committee investigating un-American activities, called upon the foundrymen to work for better relationship between employer and employee, pointing out in his forceful manner that the capitalistic system of America had given its citizenry a high standard of living.

"Through the capitalistic system," he stated, "America has outstripped all others nations in production. We lead, as usual, in output of automobiles, machinery, and the everyday commodities. Certainly our way of life can be attributed to the hand-in-hand work of the employer and employee."



SEND FOR SAMPLES

of MOLDOCHIL SHARP POINTED CHILL NAILS

(Exlusive with Capewell)

Only from Capewell can you get chill nails with either sharp points or the regular blunt end. No additional cost. They assure sound castings because they fuse readily. No danger of breaking the sand core when you use the nail with the sharp point. Comes with either the slim or regular blade. Try Jumbo Head or any of the other Moldochil sharp pointed nails yourself. Absolutely no obligation. Send your request to . . .

THE CAPEWELL MFG. CO.
Hartford, 2, Conn.

TECHNITE HIGH SPEED

Cut Costs and Cut Time with CAPEWELL HACK SAW BLADES

Faster cutting and longer lasting blades — thanks to Capewell's improved method of heat treating. Test them on your toughest job and prove to yourself that these blades are unsurpassed for cutting efficiency.

CAPEWELL

CHILL NAILS • HACK SAW BLADES

Vacuum Permanent Mold Casting

(*Continued from page 93*)

These cores were heat treated before use and immersed in colloidal graphite, this insuring a certain amount of graphite penetration to prevent material pickup. The cores were then held in a jig which bolted them down and maintained their flatness during the preheating process which is necessary for the coating of the actual casting form at the end of the core with the normal mold coating compound. These steel fins have a tendency to curl when they are withdrawn from the mold; therefore it is advisable at all times to keep them bolted down in "sandwich" type jigs under which there are gas or other heating elements to insure even gradual preheating.

It was our custom to keep a staff of women operators preparing and assembling these cores and they would be withdrawn for service at definite intervals. It was found that if metal did stick, this to a certain extent would deface and in some cases under-cut the shape of the fin, causing a definite drag which in time scraps the core. This is an instance where a routine precaution is an excellent investment.

Eliminates Human Element

This vacuum system was also applied to many other jobs other than cylinder heads and, strangely enough, where thin section castings were being produced by normal gravity process but relied on the skill of the operator in pouring to avoid the inclusion of air and misruns, the application of the vacuum system in many cases completely eliminated this hazard.

Such an example is the vane ring housing shown in Fig. 5. This is a casting of some 18 in. in diameter which has projecting from its surface, nine supercharger vanes 1¼ in. deep x 0.090-in. thick. While it was found practicable to produce this under ideal conditions as a gravity casting, the application of the vacuum plate to the under side of the main core forming the fins did away with the hazard previously encountered.

Space does not permit a full detail of the operation, but these notes will enable the reader to obtain a brief acquaintance with the operation and what it involves. Economic factors of the process will also bear consideration. First, we must realize that the prime feature of the vacuum process is to produce a

(*Concluded on page 270*)

OUTSTANDING ACHIEVEMENTS of National RESEARCH

ALLCAST

The National Smelting laboratory, one of the largest and finest of its kind in the country, has produced a number of the outstanding developments of the industry. One of these is Allcast, an important advance in aluminum metallurgy.

Allcast is a high quality, general purpose aluminum casting alloy whose properties successfully meet a large number of casting requirements.

The mechanical properties and foundry characteristics of Allcast are as good or better than those of the standard high strength aluminum casting alloys used in aircraft construction during the war.

Allcast is attractively priced and therefore affords a substantial savings to foundries and manufacturers who will not sacrifice quality, but who nevertheless must remain competitive.

Write and we shall be glad to send a copy of the new Allcast bulletin or have one of our field representatives call by appointment.

THE NATIONAL SMELTING CO.
6706 GRANT AVENUE • • • CLEVELAND 5, OHIO

NATIONAL SMELTING

(*Concluded from page* 268)

casting which is impracticable under any other means. Therefore, existing systems of costing on price per pound, etc., do not apply.

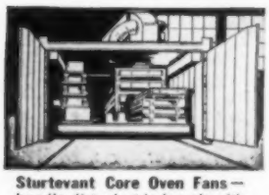
Installation of the vacuum pump and tanks comes under capital heading and is not considerable, but the cost of mold manufacture is high. Great skill is required in machining, and all the parts must be fitted most accurately. At the same time, the breaking in of these tools has a very great bearing on their ultimate life and consequently, the breaking in, proving and easing of the various parts which tighten up as work goes on, can be a costly process and should be borne in mind by any operator who considers tackling this class of work.

Trained personnel is required to handle the equipment if its life is to be sufficient to justify the necessary capital investment. But when this personnel is available and trained, the vacuum equipment installed and experience gained on the operation of a few of these molds, then the production of such items can be tackled with confidence. Provided that the castings themselves are not under 4 lb in weight, they should be commercially available in the order of $.38 to $.42 per lb.

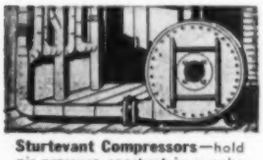
It must be realized by the reader that this is possibly a new departure in foundry practice in the United States and that special concentration and skill is required in the initial stages. Thereafter, provided this training is carried out under a properly controlled system, the operation and placing into production of such molds can become a routine operation and the knowledge gained by the key team disseminated to various other operators.

YOU GET BETTER CASTINGS

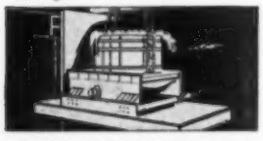
WHEN STURTEVANT CUPOLA BLOWERS "PUT AIR TO WORK" FOR MELTING!



Sturtevant Core Oven Fans—handle dirty dust-laden air with no loss in efficiency. Shafts cooled by special "heat-slinger."



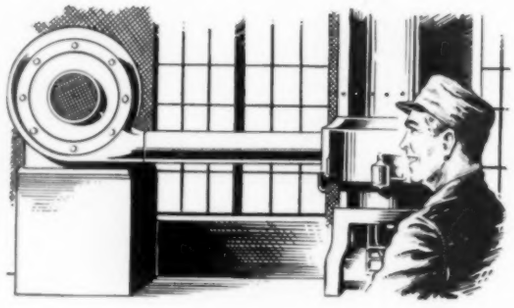
Sturtevant Compressors—hold air pressure constant, in supplying blast to oil or coke burners. Lifetime efficiency, minimum maintenance; worthwhile power savings.



Sturtevant Foundry Shake-out Systems—completely control dust and fumes, increase worker efficiency and equipment life, cut down maintenance.

Sturtevant Dust Control—pioneer experience in engineered systems for collecting dust from snagging, tumbling and sand-blasting operations.

Sturtevant Fume Control—efficient tailor-made systems for production foundries or low-operating-cost equipment for jobbing shops.



PERFECT CASTINGS result only when there is a proper balance of temperature, humidity and air supply in your cupolas. Sturtevant Compressors in cupola blower service can be carefully controlled to supply exact *weights* of air in relation to other factors, resulting in better micro-structure of castings and closer control of their chemical analysis.

Carefully controlled air speeds up cupola melting rates, makes higher iron-coke ratios possible. Result: savings in labor and materials . . . often enough to pay for a complete Sturtevant installation *plus* weight controls within a year!

Sturtevant Cupola Blowers give you even air flow without pulsation. Carefully-designed overhung wheel eliminates both misalignment and vibration. Wide housing clearances make efficiency certain for the life of the blower. For further details, write the nearest Sturtevant branch office or B. F. Sturtevant Company, *Division of Westinghouse Electric*, Hyde Park, Boston 36, Mass.

STURTEVANT PRODUCTS
DESIGNED TO MEET YOUR FOUNDRY NEEDS

Sturtevant
Puts Air to Work

B. F. STURTEVANT COMPANY • DIVISION OF
Westinghouse ELECTRIC

Opens New Offices in St. Louis

International Nickel Co., New York, has opened a technical section of its Development and Research Division, at 411 North Seventh St., St. Louis 1. Under the direction of George A. Fisher Jr., who will furnish technical assistance in the territory of Missouri, southern half of Illinois, southwestern Iowa, northern half of Arkansas, western Tennessee and the states of Nebraska and Kansas. Mr. Fisher, a graduate of Purdue University, joined the company last year. His former connections include Allison Division of General Motors Corp., Prest-O-Lite Co., Speedway, Ind., and Hurff Co., Swedesboro, N. J.

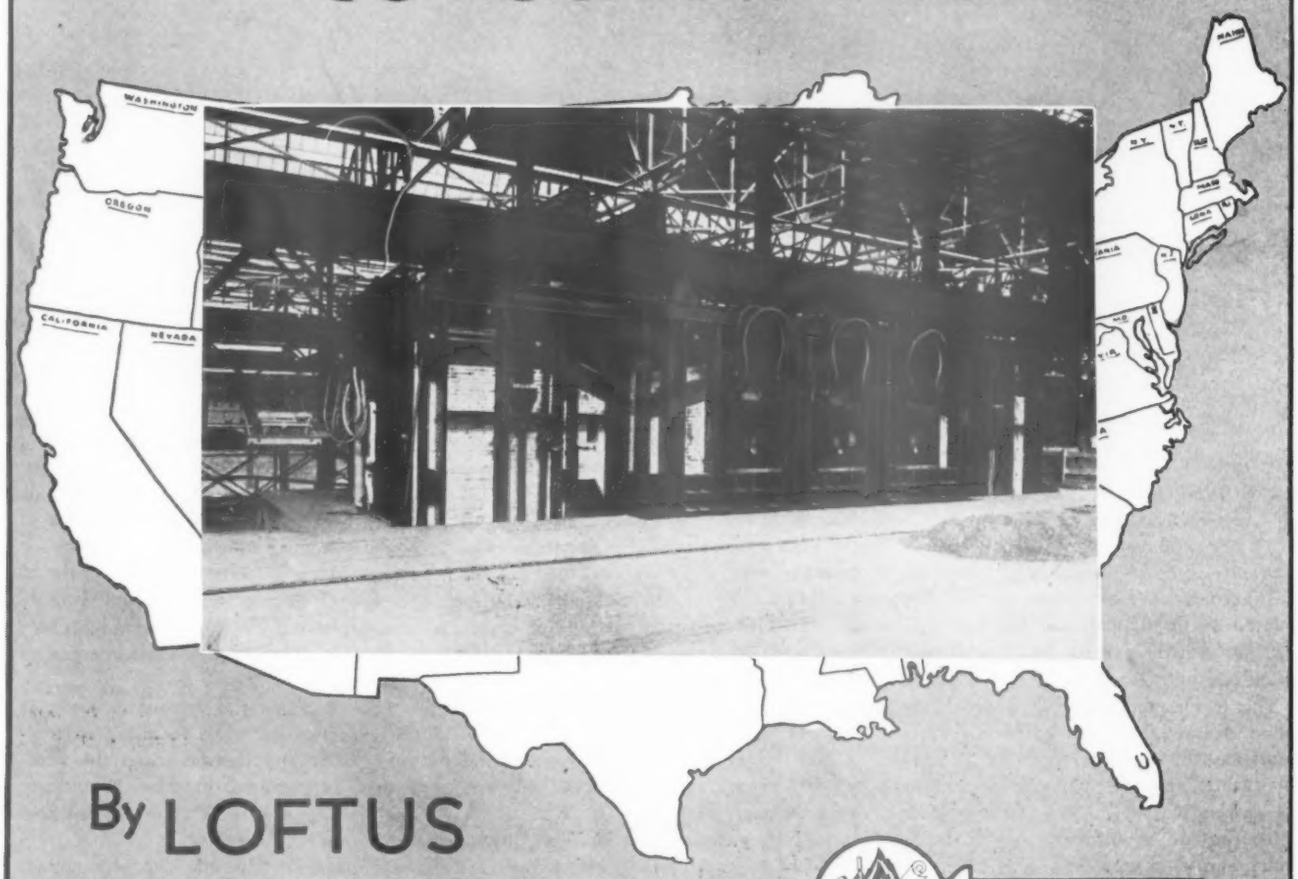
Wet Belt Machining Film Available

Porter-Cable Machine Co., 1714 North Salina St., Syracuse, N. Y., has available for use by engineers, design and production executives, tool room and die room foremen and technical societies, an industrial movie entitled "A Machine of the Age." The film traces the development and perfection of the wet belt machining method from its earliest forerunners to its acceptance as a machine tool used on production orders as well as its application on single-piece operations. The film is obtainable at no cost except return postage.

Report on Magnesium Foundries Issued

Report of the Surplus Property Administration to the Congress on December 7, 1945 on magnesium plants and facilities has been published in booklet form. This report carries information on the government-owned magnesium foundries for the production of sand castings and Defense Plant Corp. equipment installed in lessee's plants for the production of sand castings during the late war period.

From Coast to Coast



By LOFTUS

Tailor-Made Industrial Furnaces for economical performance, longer campaigns and greater production.

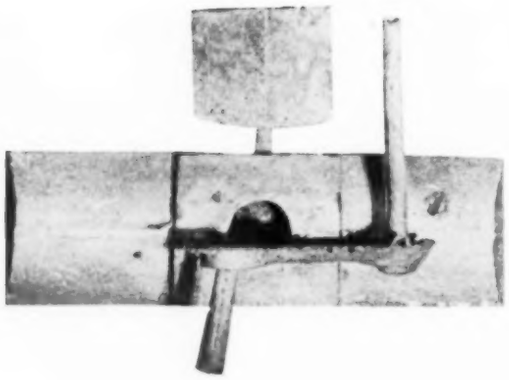
Open Hearth Furnaces have long been a specialty of the Loftus Engineering Corporation. The Furnace pictured above indicates something of the care in design and construction which is the hallmark of Loftus Engineering and is typical of the many Loftus furnaces from coast to coast that are daily giving superior performance in production and in efficiency.

Wide experience and continued success in the building of Stationary and Tilting Furnaces of both the Basic and the Acid types qualify us to offer impressive leadership in engineering design and construction.

Inquiries are invited for all types of Industrial Furnaces, Melting and Heating Furnaces and related equipment for the Steel, Foundry, Aluminum and Brass Industries.

610 SMITHFIELD ST. LOFTUS ENGINEERING corporation PITTSBURGH, PA.

Designers and Builders Engineers, Consultants, Contractors



Steel casting with small opening to feeder head. Heat generation by the compound keeps metal hot, permits feeding through juncture of this size, facilitates subsequent removal of head

FEEDING OF CASTINGS

Aided by New Compound

By JOSEPH C. SULLIVAN
Pittsburgh Editor
The Foundry

DEVELOPMENT of a compound known as Thermotomic opens up possibilities of a radical change in the feeding method for both ferrous and nonferrous castings. The material is intended to eliminate porosity and piping, and provide a sharp reduction in cost of cleaning castings.

This compound, developed by Peter Soffel, president, Pittsburgh Metals Purifying Co., Pittsburgh, relates to an exothermically reactive material for use in the casting of metals. One of the objects is to provide a self-sustaining material which can be shaped for use as inserts in risers, hot tops and in other portions of metal castings where it is desired to maintain high degree of fluidity of the metal or retard its solidification during the feeding or shrinkage.

Once burned, the compound changes from a heat generating agent to a refractory of any given shape, having a heat resistant factor of 3475 F. This reaction is not violent, as in the case of the normal thermit reaction, being slowed down by the admixture of several elements in conjunction with a refractory binder. Thus the intense heat of the material (3500 F) is controllable to any period desired, ranging from 15 minutes to 4 to 5 hours, constantly retaining the temperature of the metal in risers, or localized to desired portions of the casting.

The exothermically reactive material consists of a composition that generates heat through oxidation of a metal or metals, by means of one or more oxides modified to control the rate of heat release. Temperature of the metal is actually increased as it passes from the head into the mold, thus permitting a better metal flow into the mold. Because the passage through which the metal flows is reduced and due to the fact metal both below and above the neck is heated, piping in the casting is prevented, as also is fracturing and cracking caused by secondary shrinkage. Because of the small passage through which the metal flows, local annealing of the casting is prevented, such as would result from large heads attached to the casting. Grain structure is said to be uniform throughout the casting with use of a throat restricted by a Thermotomic insert.

This new compound has many applications, such as core rings to be used under the riser, or as a localized facing for molds where it is desirable to retain metal in a liquid state for an extended period of time; in gate cores and strainer cores to increase temperature of metal entering the mold or to decrease size of gate at juncture of casting, thereby simplifying its removal from the casting; also at light sections integral to heavy sections to equalize solidification of metal.

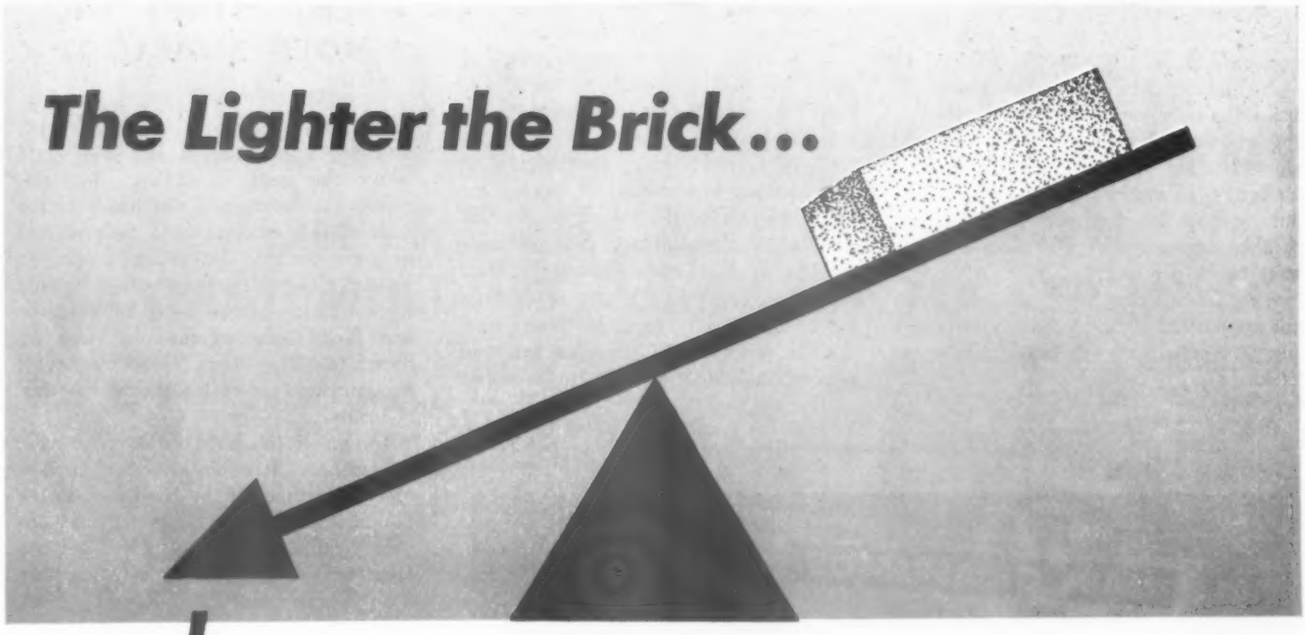
The new material is said to be past the experimental stage in many applications, over 20 foundries using the compound as standard practice in making steel rolls and various other ferrous and nonferrous castings.

Thermotomic permits use of compact heads and feeders of very small dimensions, thus eliminating considerable casting cleaning since these heads either fall off in removing the casting from the mold or can be knocked off easily. After removal, the castings can generally be dressed quickly with a minimum of grinding. One foundry reports that 8 hours' time required to remove and machine conventional type risers from aluminum-bronze castings was reduced to ¼-hour by the use of a Thermotomic insert in the riser.

A normal 6-in. diameter head is reduced to 1½-in. opening at juncture with the casting, a ring of the exothermit material being inserted in the mold at the base of the riser throat. Cross sectioning of the casting after pouring and cooling

(*Concluded on page 274*)

Steel roll shown at bottom has wobbler cast on cope end, using the compound rammed against cope neck and wobbler. Roll shown above was made by old method, requires additional machining to form wobbler



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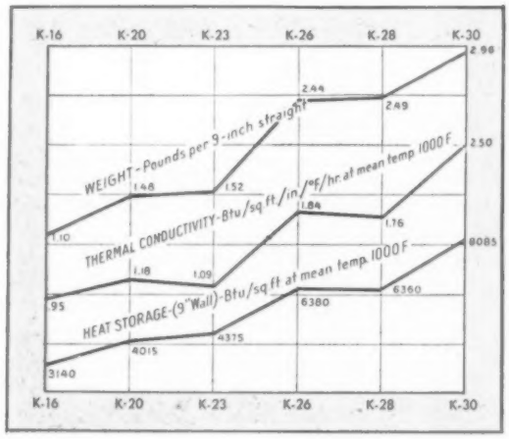

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REFRACTORIES DIVISION
85 LIBERTY STREET, NEW YORK 6, N.Y.

(*Concluded from page 272*)

shows freedom from porosity or piping under the head.

A leading steel roll manufacturer is using the compound successfully in casting wobblers on each end of the roll, as shown in the accompanying illustration. Reduction in machining cost per roll resulting from this new method is obvious; it also increases the yield from 60 per cent to 75 per cent.

Experiments are being conducted in the application of this method in the pouring of ingots, with interesting results in yield.

Patents have been applied for covering the basic applications and formulas of the material in its use in casting ferrous and nonferrous metals. Special patents have been registered by Mr. Soffel and his associate, Earl R. Pierce, formerly with National Roll & Foundry Co., Avonmore, Pa., covering the method of casting the cope neck of rolls with the normal amount of stock for machining, and the cope wobbler to actual size. Additional patents have been applied for on the redesign of ingot molds and hot tops, also those covering the procedure of using an insert in conventional ingot molds.

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VENTILATING THE MOLD SHAKEOUT

(*Continued from page 117*)

supporting beams at each end of the shakeout and connects into the space below the grate as shown. For this reason the location of the hoods at the ends of the shakeout is to be preferred in view of the obstructing supporting beams along the sides which would force location of the hoods lower down and invite some of the objections referred to. The hoods (5) are connected to bifurcated ducts leading to the dust collector.

Design of the hood throat is of vital importance. It is obvious that, in view of the proximity of the hood duct to the bottom of the shakeout grate, considerable good sand may be pulled out unless thought is given to avoiding this. Two courses must be followed. First, a deflecting sheet (6) must be located just above the elongated slot leading to the hood to deflect the falling sand away from this point and, second, inlet velocity must be kept down.

Check Total Requirements

To determine the minimum inlet velocity which can be used for the hood we must investigate the total requirements of the shakeout to provide adequate ventilation and capture the dust. State codes, such as the New York code, are quite clear with respect to the requirements, and although many foundry engineers may not agree entirely with the figures set up, it is to be acknowledged that usually, where followed with common-sense design, adequate results are obtained with 400 cfm of air per square foot of grate. In some cases we could get along with less but we must meet the code requirement. In other jobs we can specify more and there is no objection, except that adjustment in the inlet velocity to the hood must be made to avoid pulling in good sand.

Take, for example, the 6 x 8-ft mechanical shakeout. We have 48 sq ft of area (note that this is not open area but total area). At 400 cfm per square foot of area we have a requirement of 19,200 cfm. Dividing this by two, since we will have two connections, we have 9600 cfm to handle at each hood. In the 6 x 8-ft shakeout the maximum width between the beams will be approximately 60 in., or 5 ft. We must design for 1920 cfm of air per foot of length of hood. We would like to have an inlet velocity of not above 1500 fpm but will be satisfied with anything under 2000 fpm. Therefore, we will make the height of the opening to the hood 12 in., if the space between the

(*Continued on page 276*)

MOLDING MACHINES

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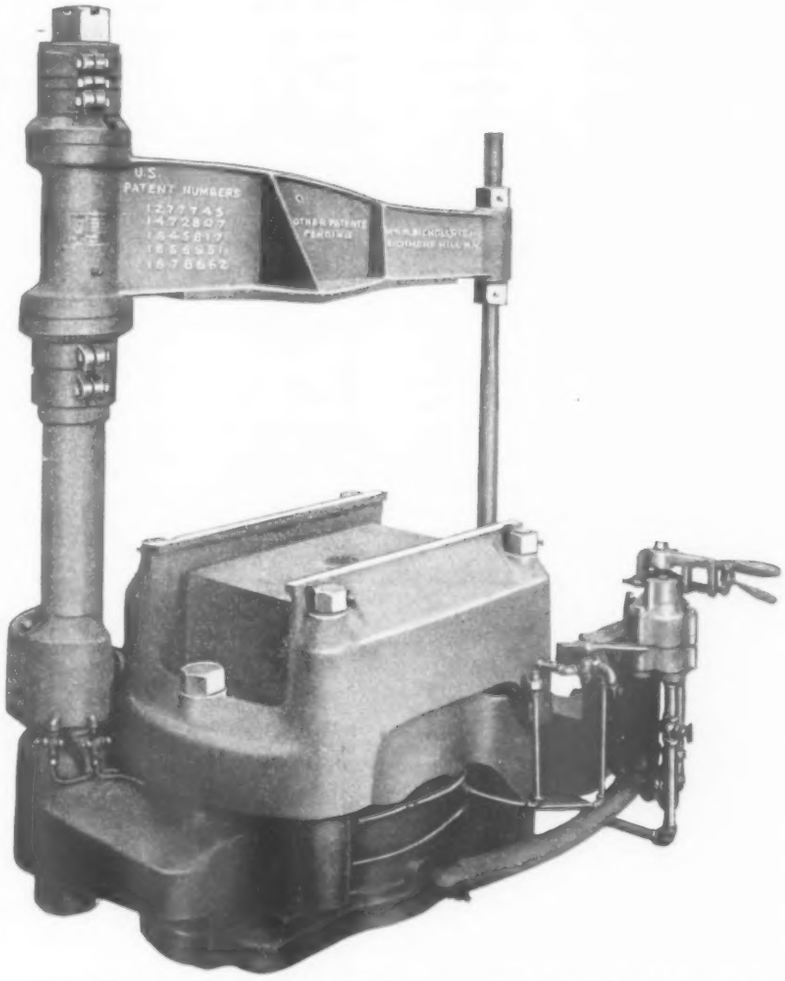

16-36 Type D Heavy Duty Jolt Squeeze Molding Machine with Pattern Drawing Device—Open End Frame—7" diameter jolt piston—16" diameter squeeze piston

Redesigned to a minimum of working parts, thereby greatly reducing maintenance cost and at the same time lowering operating costs through saving of labor.

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NICHOLLS

(*Continued from page 274*)

bottom of the shakeout will permit.

The hood proper design must permit a uniform increase in velocity through to the connection to the exhaust duct. This is necessary to avoid dead zones in the hood proper where dust may be precipitated, thus filling the hood with solids and rendering it inoperative. The velocity in the main pipe leading to the dust collector should be not less than 3500 fpm. This velocity will carry the dust without trouble unless accompanied by considerable moisture which would cause it to stick to the pipe walls. High velocity would result in needless erosion of the pipe by the abrasive particles and consequent increased maintenance. The riser connecting the main pipe to the hoods should have a velocity of 3750 fpm. The increase in velocity through the hood therefore must be from 1920 fpm to 3750 fpm.

The hood should be designed with long taper end and bottom to produce the increased velocity gradually. Rough seams and flanges on the inside of the hood should be avoided. They result in removal of solids from suspension and consequent building up of solids in the air passage. No dampers should be incorporated in the design since adjustment by dampers results in lowering the velocity with resultant danger of plugging the several hoods and ducts.

The double canopy hood for shakeout use contains splendid possibilities for the foundry producing small to average size castings. This design is especially adaptable where the molds are of the strip flash type carried through the shakeout on a conveyor. It also is adaptable where the mold is carried to the shakeout by an overhead trolley system and has even been used where the mold is picked up by a jib crane for handling to the shakeout. In the first-named type the space between the two hoods at the top may be entirely closed, whereas in the latter instances a slot must be left in the top along the center line between the two hoods for passage of the trolley.

A hood of this type is shown in Fig. 6, the style shown at *A* being of the closed top design and that at *B* of the open top to provide space for the trolley to work through. It makes little difference whether the outlet louvers are located in the canopy section or contained in the back of the hood. In the latter design less head room is required. Where the duct goes under the floor it is often a more convenient and economical design. The main consideration is to close up as much of the ends as possible and provide adequate air velocity through the open space to capture the hot dust.

Since two full sides of the shakeout are enclosed lower air volume may be used. In view of possible counter currents within the area of the shakeout caused by open windows, doors or by fans, an inlet velocity of at least 200 fpm should be used. Some state codes require not less that 200 cfm per square foot of shakeout area which for a 6 x 8-ft shakeout would be 9600 cfm. Assuming that both sides are capable of total enclosure we must admit 4800 cfm at each end and this divided by 200 fpm would allow 24 sq ft of opening at each end. Since the shakeout is 6-ft wide the hood height should not exceed 4 ft unless some of the end area at each side of the opening may be closed off. This is usually not only possible but also preferable.

In the case of the hood shown at *B* we must take into consideration the open slot along the top of the hood. This will usually be at least 12-in., making a total of 8 sq ft and allowing 20 sq ft for the end opening. Since it is entirely advisable to work with the 200 fpm figure as the minimum velocity it will be necessary in a good many jobs to increase the total volume of air removed from the shakeout to a higher figure.

What has been said in connection with

(*Concluded on page 278*)

Foundry Statistics

(Reported by Bureau of the Census)

Aluminum Casting Shipments

(In net tons)

	Total	Sand	Perm. Mold	Die
1944	257,200	160,600	53,100	42,100
1945	186,971	98,615	53,165	34,296
Jan.	21,700	12,650	5,300	3,650
Feb.	21,000	12,450	4,850	3,600
Mar.	24,100	13,850	6,100	4,050
Apr.	21,900	12,400	5,550	3,850
May	20,700	11,350	5,450	3,800
June	18,600	9,750	5,050	3,700
July	14,550	7,000	4,350	3,150
Aug.	10,450	5,000	3,100	2,250
Sept.	7,250	3,450	2,450	1,300
Oct.	9,397	3,819	3,764	1,783
Dec.	8,583	3,417	3,592	1,541
Nov.	8,741	3,479	3,609	1,622
1946				
Jan.	12,261	4,710	5,533	2,002

Magnesium Casting Shipments

(In thousands of pounds)

	Total	Sand	*Perm. Mold	Die
1944	201,487	75,221	123,904	2,362
1945	83,752	42,471	39,592	1,689
Jan.	10,424	6,149	4,028	247
Feb.	10,366	5,832	4,317	217
Mar.	12,646	6,703	5,677	266
Apr.	11,903	6,257	5,464	182
May	12,134	6,081	5,865	188
June	10,565	4,878	5,473	214
July	9,838	3,961	5,677	200
Aug.	4,960	1,820	3,036	104
Sept.	169	137	13	19
Oct.	251	216	13	22
Nov.	235	207	15	13
Dec.	261	230	14	17
1946				
Jan.	398	349	16	33

*Includes incendiary bomb castings.

Gray Iron Castings

	Shipments—Total	Shipments—For Sale	Unfilled *Orders
1944 (total)	9,165,726	.....	.....
1945 (total)	8,753,392	5,344,750	.....
Jan.	791,395	485,027	1,728,034
Feb.	752,266	464,858	1,804,207
Mar.	857,616	537,305	1,904,419
Apr.	773,988	481,237	1,844,188
May	798,055	493,698	1,829,754
June	781,935	496,662	1,810,609
July	689,711	429,100	1,811,659
Aug.	682,826	416,947	1,629,614
Sept.	661,738	392,742	1,579,146
Oct.	684,484	413,591	1,559,765
Nov.	667,506	400,919	1,644,706
Dec.	611,872	352,664	1,669,596
1946			
Jan.	649,430	406,799	1,901,187
Feb.	507,693	342,182	2,006,095

*For sale only.

Steel Castings

	Shipments—Total	Shipments—For Sale	Unfilled Orders
1944 (total)	2,435,421	1,843,386	.....
1945 (total)	1,850,830	1,438,939	.....
Jan.	201,162	157,176	953,179
Feb.	186,364	146,165	1,035,848
Mar.	211,890	166,896	1,020,093
Apr.	190,166	150,281	1,001,883
May	186,376	145,092	834,428
June	167,140	125,126	765,862
July	133,601	99,606	710,783
Aug.	123,835	96,151	545,165
Sept.	110,631	82,444	503,745
Oct.	119,857	96,868	429,698
Nov.	113,694	89,088	426,766
Dec.	106,114	84,046	413,853
1946			
Jan.	92,914	74,349	*346,252
Feb.	55,923	44,463	*379,391

*For sale only.

Malleable Iron Castings

	Shipments—Total	Shipments—For Sale	Unfilled *Orders
1944 (total)	878,233	619,588	.....
1945 (total)	790,731	520,887	.....
Jan.	78,788	54,111	345,112
Feb.	75,220	51,089	341,558
Mar.	85,307	58,711	349,935
April	76,065	51,011	346,421
May	79,565	52,789	328,471
June	71,992	47,510	285,210
July	55,813	35,439	284,017
Aug.	52,647	33,239	232,136
Sept.	46,960	28,506	219,905
Oct.	59,096	37,307	229,618
Nov.	57,315	36,007	227,309
Dec.	51,963	35,168	236,648
1946			
Jan.	53,685	38,181	245,878
Feb.	40,156	29,338	247,644

*For sale only.

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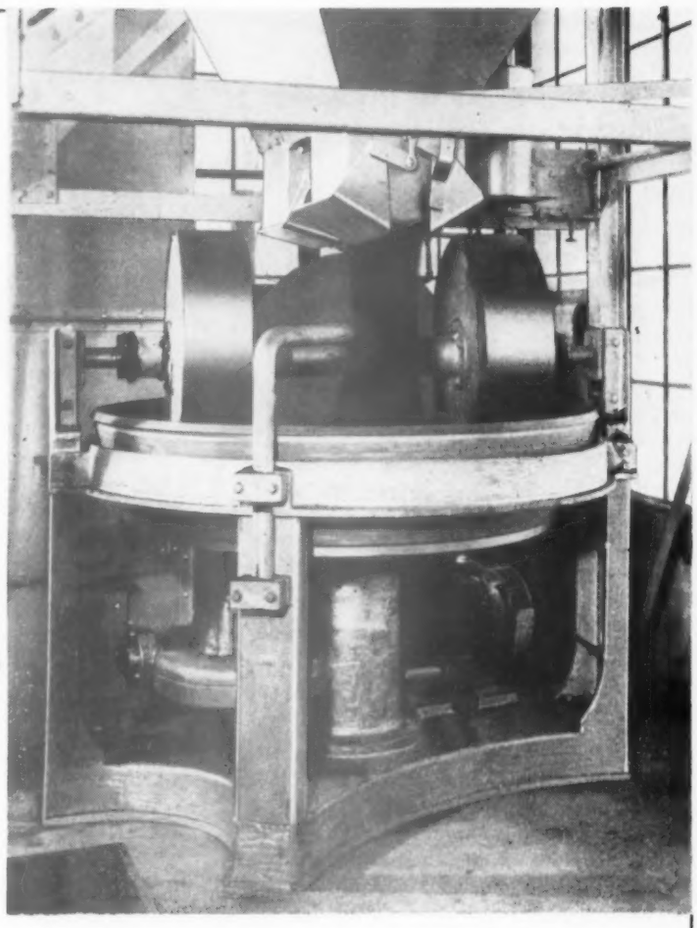
610 MIXER



We were glad to welcome many old acquaintances and meet a host of new ones at our Foundry Show exhibit.

The expressions of satisfaction from users were even more gratifying than the indications of interest by those with whom we had the pleasure of discussing Clearfield equipment for the first time.

To those who were unable to attend the Convention we wish to say:

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(*Concluded from page* 276)

the double canopy hood will apply to almost every type of enclosed hood such as used with continuous car type conveyors dumping automatically onto vibrating shakeouts, shakeouts located within tunnels and similar installations. The amount of air removed to effect ventilation must in all cases conform with state code requirements.

One perplexing problem which occurs with many shakeouts concerns the spillover grate at the end or side, as the case may be. Many foundrymen move the mold to the shakeout area where it is opened up and then the cope is moved to the shakeout followed by the drag. A grate is incorporated in the floor design to take care of the sand which spills out during the handling operation. In other foundries an occasional long flask must be shaken out but the frequency is not ample to warrant the installation of a long shakeout. To compensate for the shortness of the shakeout a floor grate may be installed at one or both ends of the shakeout proper to take care of this spill. The spill from whatever source is usually run into the same hopper below the shakeout by making the hopper sufficiently long.

Wherever possible the overhead hood, if used, should include these spillover grates and handle sufficient air to provide adequate ventilation. Here again the state code covering such grates must be consulted. However, in general a volume equal to one half that allocated to the regular shakeout will suffice.

Another consideration in connection with ventilation of the shakeout which often is overlooked is the ventilation of the hopper below the shakeout in the case of over-floor ventilation. A good rule of thumb in connection with these hoppers is to use 1000 cfm of air for each 20 sq ft of shakeout area or less. The connecting duct should be located as high as practical on the hopper and protected from falling sand by an overhanging roof.

Motion Study Films Are Offered

Chicago Chapter of the Society for the Advancement of Management has announced that copies of "The Original Films of Frank B. Gilbreth," are available to universities, business and industrial organizations, after five years of intensive preparation. The film showing applications of the principles of motion study which Mr. Gilbreth filmed beween 1905 and 1924, covers 1200 ft. 16mm, silent film, and is available for $75 with reel and metal container, through the society.

The Army Looks at Gray Iron

(*Continued from page* 103)

curement thought primarily of finished products, such as tanks, trucks, ships, airplanes, etc., and forgot the components which are used in the manufacture of these items. Production programs frequently were delayed because proper attention was not given to the procurement of gray iron castings. "While they were tooling for tanks, there was no demand for engine castings. Then when they were ready to start building tanks, they reached for castings, but the facilities to produce these castings were not available because gray iron foundries had lost a great number of men to other war industries and to the draft. Foundrymen could not keep technicians and skilled workers in foundries because men assembling tanks would have No. 1 priority, and men producing gray iron castings for tank engines had practically no priority at all." Many important uses of gray cast iron for direct or indirect use in war production were cited.

Foundry Employees Drafted

The experience of losing men to the services or to other industries early in the war, and then being unable to find sufficient help to meet tremendous demands for gray iron in the later phases of the war was emphasized by most of those present. When the castings were quite intricate, scrap losses mounted and deliveries were further delayed when inexperienced help was hired. In many cases the inspection of castings was too severe, causing a lot of unnecessary scrap, and frightening other foundries from attempting to produce such types as automotive castings at a time when the need was critical.

Looking to the future, one member of the committee stated "If we again had an emergency, the foundry organization and the men should be frozen. The industry should be allowed to keep valuable and essential men, because the business is not mechanical. You just cannot run a foundry on a mechanical basis. It is absolutely necessary to keep men with experience." Special emphasis was placed upon the thought that in the case of another emergency more care should be given to screening men who go in the armed services. Since it has been demonstrated that castings are needed when production gets rolling, regardless of the fact that demand lags early in the emergency period, trained men should be held in the foundry.

The question was raised to whether or not gray iron castings were critical items during the war. Some misconception evidently has arisen and in certain governmental quarters it is thought the demand did not exceed capacity. Several foundrymen present indicated they were not able to meet all requirements. It was pointed out that a number of captive foundries, including some producing automotive castings, were closed early in the war, and that when the demand for gray iron became heavy, these plants were not opened, due to a variety of reasons including inability to secure sufficient labor.

In further discussing the effects of the captive foundry situation, it was pointed out that in this country the capacity of captive foundries is about 300,000 tons per month, and that of independent foundries about 400,000. The government permitted almost all of the 300,000 tons per month to be shut down. "When the large companies wanted castings for trucks, tanks, engines, they came to the jobbing foundry while their shop was idle. The government never should have allowed the captive foundries to close."

Decrease Production of Castings

Although demand increased, it was pointed out that total production of gray iron castings actually was less in 1944 than in 1941. It was stressed however, that the production figures do not necessarily indicate what the gray iron industry did for the war effort. "In the early years of the war we were confronted with a tremendous quantity of large castings for building production tools. It is altogether likely that in 1944, tonnage of lighter castings did a better job in meeting the needs of the war effort than the greater tonnage of heavier castings in the previous year." Another shift in production emphasis was found in connection with cast iron pipe, when production fell from over 1,000,000 tons in 1942 to under 700,000 tons in 1944.

Discussion of automotive work produced on the mechanized production line brought forth the comment that the so-called "jobbing" line of work is equally important. Most of the work in jobbing foundries calls for small runs of a wide variety of castings for machine tools and other machines, jigs and fixtures, repair work, etc. Heavy mechanization is not possible in these plants, and therefore it is important that skilled men are available. If industry is to function, the jobbing type of foundry must have some protection for its manpower.

The second discussion topic raised the question, "Now that World War II ex-

(*Continued on page* 280)

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(*Continued from page 278*)

perience may be partially or wholly evaluated, what action would you take if your industry were called on to produce similar castings and in larger volume?" Under the heading "Types of Processes" it was stated there would be some improvements in processes, but that the basic processes in use today would continue to be employed in a future emergency.

Considering "Types of Raw Materials and Their Availability," it was pointed out that studies had been made by the Industrial College on the cost of bringing home battlefield scrap. These show that, considering the problem only from the standpoint of price, the cost would be excessive. However, the committee discussed the problem from present needs, due to the shortage of pig iron and scrap, and also from the fact that the abandonment of this scrap is depleting our natural resources. The statement was made that if the foundry industry were fully manned at the present time, there would not be enough pig iron or scrap to permit full operation.

Urge Battlefield Scrap Use

Several of the committee members felt it advisable to buy battlefield scrap, both from the standpoint of protection against emergencies and to conserve our resources. It was pointed out that "at the rate we were going in 1942, the Mesabi ore reserves would be depleted in a short while." It was also brought out if battlefield scrap is to be used, it should be melted and pigged so that the analysis of certain lots would be uniform. Due to the wide variety of analyses it is hard to use battlefield scrap mixtures, especially for castings with exacting specifications.

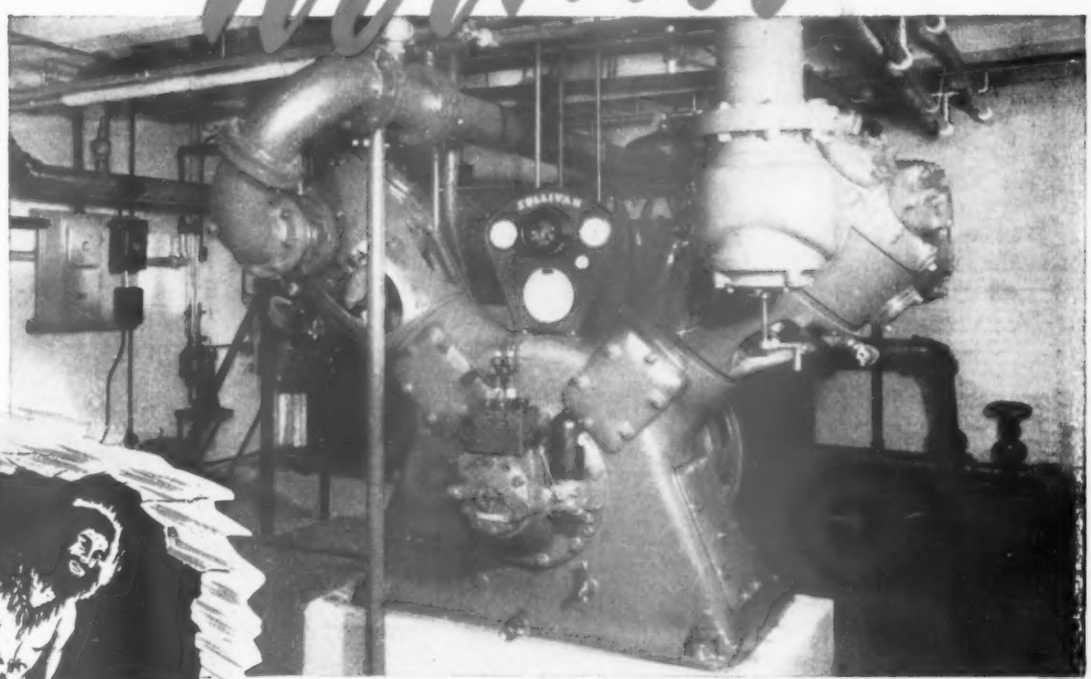
The shortages of pig iron and scrap brought the statement that "anyone in the foundry business knows that unless things get better quicker than we think, we are going to be faced with a shutdown for lack of iron." It was indicated that some foundries already had closed down and that others would be forced to do so, especially if a coal strike caused a serious curtailment of pig iron production.

In the matter of pig iron production, it was pointed out that "figures coming into the War Production Board show that in December, 1945 the production of malleable and foundry iron was higher than at any other time in the last seven or eight years or perhaps for a lengthy period. The total production for that month was well over 400,000 gross tons. That is at a higher yearly rate than ever produced before."

In response to a question as to why the CPA continues to enforce a 30-day inventory for pig iron, it was explained that the demand at present is probably 50 per

(*Continued on page 282*)

Maintenance Engineers call them *hermits!*



Sullivan WN-112 air compressors

Maintenance engineers call their Sullivan WN-112 air compressors "hermits" because they turn out full rated capacity twenty-four hours per day year after year with so little attention that they are almost forgotten. It is not unusual for them to run thousands of hours continuously without any maintenance.

Sullivan WN-112 compressors are modern, two-stage, double-acting, heavy-duty, continuous-service compressors, much smaller than old style compressors of the same capacity and yet have operating economies exceeding those of the older, bulky units.

Available in single or twin units with piston displacement capacities ranging from 378 c.f.m. to 1828 c.f.m. at pressures up to 125 p.s.i. For complete details ask your nearest Sullivan office for Bulletin A-52. **Sullivan Machinery Company, Michigan City, Indiana. In Canada: Canadian Sullivan Machinery Co., Ltd., Dundas, Ont.**

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THE WORLD'S FINEST AIR COMPRESSORS from 1/4 to 3,000 H. P.

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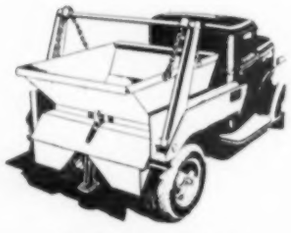
TELEPHONE ANDOVER 5922

NO FIRE HAZARDS with Brooks LOAD LUGGER Disposal System



Bucket Capacity 1½ to 4 Cu. Yds.

Use 5 to 10 dump buckets with each Load Lugger unit. Only 15 seconds for loading or unloading.

Don't risk the chance of fire. Play safe by using Brooks all-steel one-piece detachable Buckets instead of wooden bins for foundry waste, furnace slag, casting rejects or hot sand.

Using a chute, as shown above, is one of many practical methods. Buckets may be spotted at handy points for accumulating materials, then picked up by a Load Lugger, hauled, dumped and returned.

Many other uses for this hoisting unit. Fits on truck chassis without altering frame. Write for new catalog.

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(*Continued from page 280*)

cent greater than production. "We have made some estimates for requirements of pig iron for 1946. If the scrap-pig ratio that was in use for the first half of 1945 continues, it can be assumed that we will need approximately six million net tons of pig iron in 1946. Because of the scarcity of scrap, the demand for pig iron has increased nearly one-fifth in recent months." It was also pointed out that there may be some change in type of work whereby heavier percentages of pig iron are required, but most of those in attendance believed that the reason for an increase in pig iron requirements is due entirely to the shortage of scrap. "The amount of scrap used in the manufacture of castings depends a good deal upon the location of the foundry. The South does not produce the quantity of scrap available in the North. Therefore, southern foundries have to use higher percentages of pig iron." Because of this shortage of scrap and the tight situation with regard to pig iron, it was recommended that scrap drives be inaugurated at once so that metal will be available as the reconversion program develops.

Decentralization Under Way

In discussing "Locations of Foundries," most of those participating believe that decentralization is under way and that foundries of the future will be built away from the large urban centers. In addition to the advantages to the industry, such a movement is desirable from the point of view of national security.

Considering the subject "Versatility of Industry To Meet Types of Urgent Products," it was pointed out that the foundry industry probably is the most diversified because each one produces different castings or different combinations of castings. Operations in each plant are different to some extent, with one foundry doing heavy work, another light work, one operating a high production conveyor job, another a permanent mold plant, and another a jobbing foundry. No two foundries are alike. During the war, many foundries were making castings that they never dreamed of making before the emergency. This was possible because of the know-how acquired through experience.

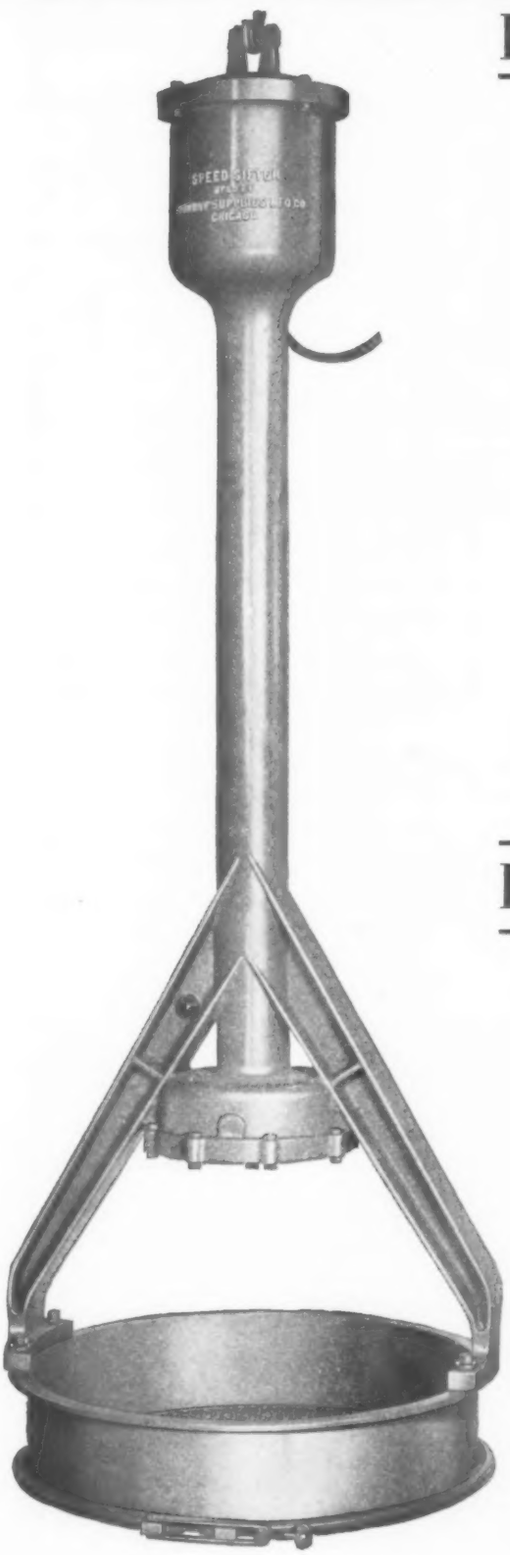
The discussion indicated that producers of foundry equipment and supplies did an excellent job during the war, and that in the main foundries were able to get equipment within reasonable delivery periods especially considering priority restrictions on materials and components needed in the production of such equipment. However, it was pointed out that it is more difficult to get the necessary materials and machines needed for present operations than it was during the

(*Continued on page 284*)

Increase Production

with the

ROTOPLANE SPEED SIFTER ★ RED ELECTRIC VIBRATORS



ROTOPLANE SPEED SIFTER

The ROTOPLANE Speed Sifter is an *improved* sand riddle of much greater capacity and much longer life. One size and type serves all purposes in the foundry—does *all* your sifting more quickly and economically.

It is easily handled by one man, weighs approx. 90 lbs., is 62 in. high overall. The one-piece frame of tough aluminum alloy makes for a remarkably effective vibration. Its smooth, free, rotary action vastly increases bearing life; all bearings grease packed. All mechanism of the ROTOPLANE is *completely* enclosed—no bearings or activating parts of any kind exposed to dust and grit.

The Quick-Change Sieves are instantly interchangeable, mounted in smooth, flat steel ferrule, with 20-inch diameter clear sifting area. No jagged screen edges to tear workers' hands, no storage problem. *Ten Days Free Trial.*

$175.00 f.o.b. Chicago—complete with cable, safety ground wire, new sieve (2 to 4 mesh). Standard ⅓ h.p. motor, 115 or 230 volt, 60 cycle, single phase.

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True-to-pattern castings make satisfied customers . . . more repeat business. Increase your production and castings quality with RED Electric Vibrators. Sturdy, dustproof, lowest operating cost (electricity does not freeze). Unequaled for consistent year-'round results in foundries all over the world.

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No. 1—Light match plate work	$10.00
No. 2—Medium match plate work	13.00
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No. 9—Machine and heavier work	24.00

Third (ground) wire per U. S. Govt. code—furnished with No. 9 at no extra cost; $1.00 extra with Nos. 1, 2 and 5 vibrators.

KNEE SWITCHES for operating Red Electric Vibrators:
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FOUNDRY SUPPLIES MANUFACTURING CO.

2221 Orchard Street **Chicago, Illinois**

CABLE ADDRESS: "ROTOPLANE CHICAGO"

(*Continued from page* 282)

war. In the matter of equipment this is due to shortages of components, such as motors, castings, etc. Mention was also made of the fact that the present shortage of lumber is being reflected in the foundry industry. Patternmakers in many localities are unable to secure the proper types and quantities of pattern lumber and therefore this factor may hinder production in the immediate future unless remedies are found.

The next question asked "How Should World War II governmental controls be changed in the event of a future emergency?" The members of the committee indicated that while the controls established, such as the Controlled Materials Plan, were good as far as the mechanics of operations were concerned, the gray iron foundry encountered tremendous difficulties because it was the stepchild of the war program until 1943. "There was no true recognition of the underlying factors of our economy in relationship to gray iron castings. The controls were good. But by the time foundries were recognized and the government wanted castings, there was not sufficient manpower left to produce these castings."

Several committee members indicated the difficulties which were encountered because the foundry industry did not have a special branch in the War Production Board setup. In any future emergencies where a similar civilian organization is organized to handle production, a ferrous foundry branch should be provided. The basic raw materials of the three ferrous branches are the same. With government personnel completely familiar with foundry operations, problems could be solved to the greater advantage of war production. It was indicated that "the foundry industry did not have a branch recognized on top side, with a top administrator who could walk into an Army office and say "Damn it, Colonel, I need this!"

Discussing the problem of war expansion, statistics developed by the War Production Board and previously reported in THE FOUNDRY were presented. The opinion was expressed that 100 per cent of the gray iron expansion will be employed in commercial production, especially at the present time when demand for gray iron castings is at a peak. In the matter of capacity, the Bureau of Census reports between 18 and 19 million tons as the rated capacity. The peak year's production was in 1941, which was over 11 million tons of gray cast iron. "As an engineering material, gray iron ranks second only to steel in the tonnage of production." The Bureau of Census has also estimated that nearly 10,600,000 tons of gray iron castings will be required in 1946, and that an additional 2,500,000 tons of iron castings produced from direct metal also will be needed.

Discrepancies regarding estimates on the capacity of the gray iron foundry industry were discussed. "The melting department of gray iron foundries works on a one-shift basis. If we had the manpower to staff these foundries, they could probably produce 18 or 19 million tons a year. Manpower limitations probably will force gray iron foundries to work at peak loads for the next 4 or 5 years."

In a government survey of the gray iron industry recently completed, response from 1875 foundries showed a

(*Continued on page* 286)

CLEANS LIMITED VOLUME OF LARGE VARIETY CASTINGS

HOW the Mack Mfg. Co., New Brunswick, N. J., handles the cleaning of core sand from a limited volume of various size castings is shown in the accompanying illustrations. Two 48 x 72 in. airless blasting units are employed. The one shown at the left is set below floor level so that the top front of the apron conveyor is practically flush with the floor. It is used for cleaning larger castings, such as engine blocks, cylinder heads and transmission cases. It will accommodate at one time either one 680-lb engine block, 12 to 15 cylinder heads or 17 transmission cases.

The unit at the right is installed in the conventional manner. It is provided with a floor type loader and is unloaded into tote boxes by gravity drop, hand picking, or both, depending on the castings. This machine usually is loaded with slightly more than 2000 lb of miscellaneous small castings such as water pump housings, manifolds, transmission case covers, etc., and is handled by a three-man crew.

Cleaning in both cases is accomplished by airless blasting combined with a tumbling action. The center illustration shows some of the type of work cleaned and its "before" and "after" condition. Where a larger production is involved a more efficient setup would involve use of a special cabinet which carries the block on a monorail through the cleaning blast. (Photos courtesy American Foundry Equipment Co., Mishawaka, Ind.)

VERTICAL CONVEYOR loads and unloads at same point, opposite sides, or on different floors.

CONTINUOUS-CONVEYOR horizontal pass oven with combination gas and oil fired heater.

BATCH TYPE. Best all-around oven for the average foundry. Bakes cores and molds of all sizes.

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CAR-LOADED Core-Baking Oven for large, heavy cores and molds. Forced convection heated.

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You'll get more cores per day, baked to a T and with rejects held close to zero, from *any* oven that bears this familiar emblem—the 44-year-old trademark of experienced DESPATCH engineering.

This speed in corebaking, *often* 15% *to* 40% *faster* than with many ovens, is not an advantage confined to special model DESPATCH Foundry Ovens; it is a "built in" feature, painstakingly engineered and provided in *all* DESPATCH Ovens, from the smallest batch oven to the largest mechanized conveyor-type oven. And it's a "natural" for today, when you need to bake maximum number of cores in minimum time to meet reconversion quotas.

WILL HELP YOU MEET PRODUCTION DEMANDS

With their high-speed forced convection heating systems, automatic controls, extra-rugged construction, easy-loading facilities and other important features, DESPATCH Ovens are ideally adapted to both present and future requirements of your foundry.

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The Alnor portable Pyro-Lance is a rugged, durable, portable pyrometer built with shock-resisting movement and enclosed extension thermocouple. It stands up in foundry service and gives the accurate temperature readings essential to low-cost production of sound castings. Especially suited for use on molten brass, bronze, copper, aluminum bronze, magnesium alloys, and similar metals where temperatures are not over 2300 F. Long life, enclosed thermocouple takes true readings below the surface, unaffected by dross or surface conditions.

Built in standard range, 0-2500 F. Also with bare wire thermocouple for low temperature metals in crucibles or ladles. Write for bulletins giving complete description.

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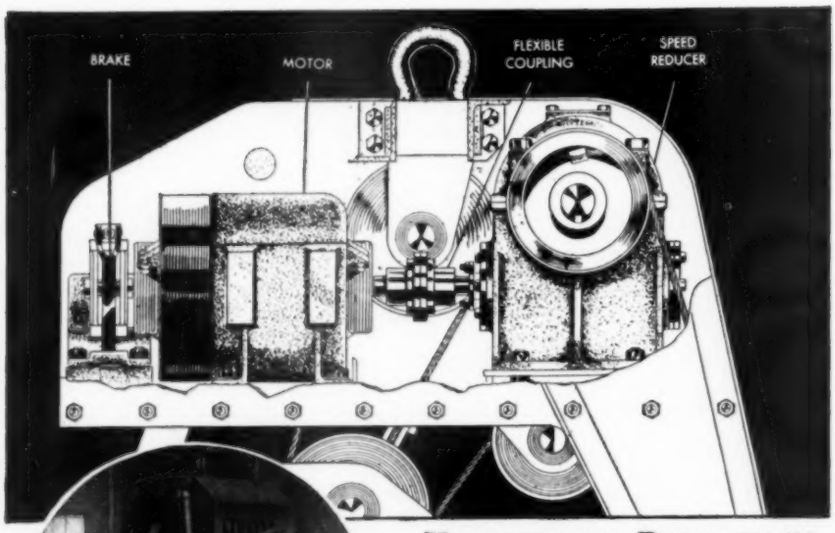

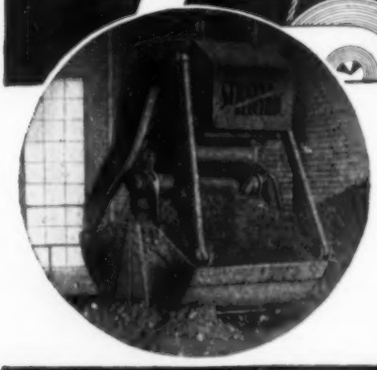

HOOK 'ER ON—PLUG 'ER IN

ABOVE YOU SEE WHY the Erie Electric Bucket works in its own headroom controlled from the crane cab. This sturdily constructed bucket needs only to be hooked over the crane hook and power line plugged in. The man in the cab controls the opening of the bucket from cracking the lips to any degree of opening or closing. The extra in-built weight permits easy penetration. *Write for complete particulars.*

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THE MOST COMPLETE LINE BUILT

» ALSO AGGREMETERS
ELECTRIC OVERHEAD CRANES
PORTABLE CONCRETE PLANTS

(*Continued from page* 284)

monthly capacity of 1,018,000 tons. One committeeman stated, "I can well understand how that is arrived at. We get many of these questionnaires. Someone in the office will ask, 'How many tons can we melt?' We have four 72-inch cupolas and can melt 22 tons an hour. He multiplies 22 by 24, assuming a day and night shift, which we never employ, and the first thing he has built up a pretty good capacity figure for our company." In many foundries it is not the melting capacity but the capacity of other departments that governs the production potential of the plant. One committeeman indicated that the capacity of the coreroom governed the total production of his plant. The need for greater care in developing questionnaires for such items as capacity was emphasized.

The question was asked, "How successful is the gray iron industry in developing new uses and new products?" Discussion developed the fact that research is not a concerted effort in the gray iron industry. It is being done by many individual operators who are the more forward-looking ones in the industry. At the same time, producers of alloys and other supplies are doing a fine job in conducting research and in helping foundries to incorporate new developments in production practices. Mention was also made of the excellent research work being done at Battelle Memorial Institute and other organizations. The research work of the Army and Navy also was discussed. The Naval Research Laboratory is in the process of undertaking a very comprehensive research program in an effort to study some of the basic facts of gray iron production.

Want Something for Nothing

In connection with the Naval research, it was pointed out that "industry can be criticized because it is in favor of getting the information produced through such research projects, but is not interested in giving information. When industry learns something, it is kept under the hat on the theory that it is money in the pockets of members of the industry. But when the Navy learns something, it is expected to give this information to everybody gratis. If all foundries would contribute something to a general research program and not expect to take away all of the information developed without contributing, both the military services and the industry would benefit greatly."

Government specifications were criticized. Many specifications developed by the Army and Navy are quite arbitrary in the matter of materials required. Experience developed during the war showed that in many instances substitute products, including casings, provided just as satis-

(*Concluded on page* 288)

Production **STANDARD ELECTRICAL TOOLS** Efficiency

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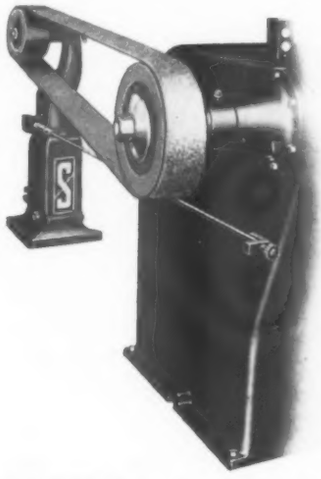
TYPE R2V TWO MOTOR BUFFER-POLISHER

Any spindle speed between 1500 and 3000 R.P.M. instantly with "Speedial" control.

Grinding (polishing) operation accomplished on one side while other side may be used for independent buffing operation, if desired.



BACK STAND IDLER—Standard No. 1 Back Stand Idler will serve many grinding and polishing operations for reflecting a better finish at lower cost.

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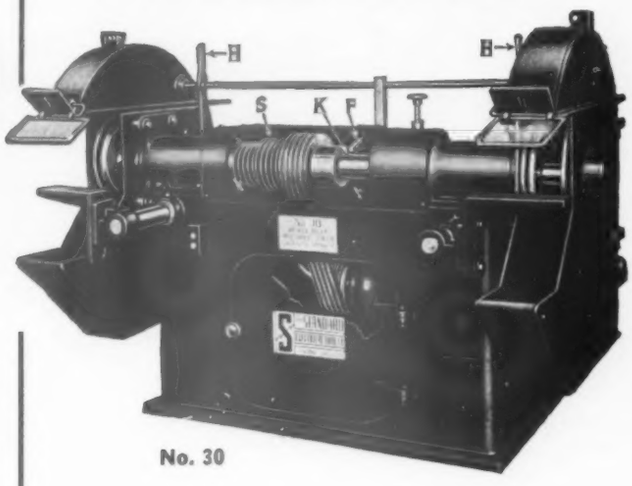

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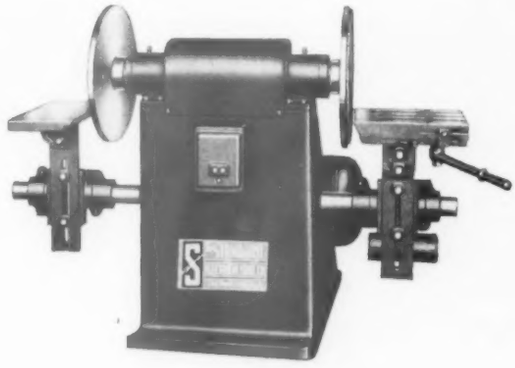
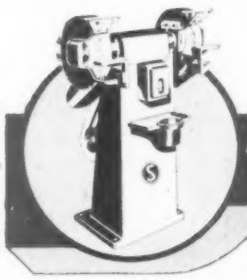


TYPE 7DD 20″ DISC GRINDER

1 H.P. 10″ to 7-1/2 H.P. 20″. Motor or back. Multiple V-Belt drive. Also combination grinder-disc grinder.

Write for Catalog 43



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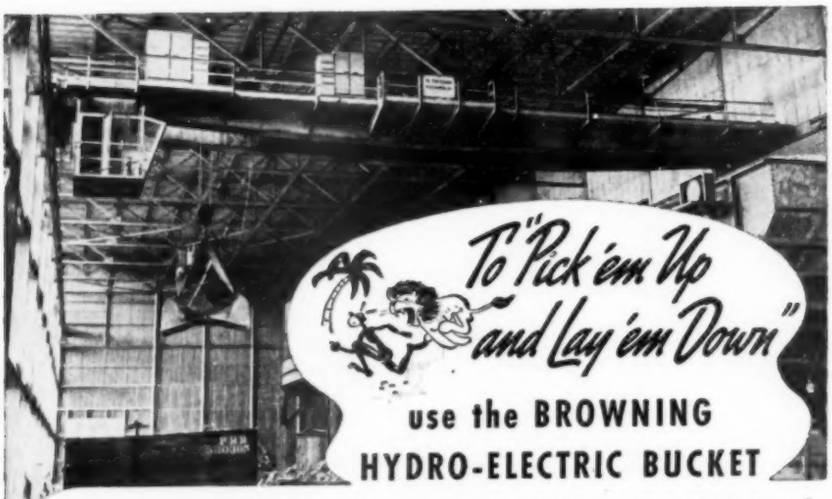

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Handles many important jobs faster, better, for less. A.C. or D.C. current. Electrically driven hydraulic pump connected to cylinder and ram, in turn connected to bucket lips by trunnion; movement of ram opens and closes bucket. When bucket closes, pressure reaches maximum and oil passes through relief valve; no overloading of motor, no damage to bucket. No sheaves, cables, chains or other trouble-causing "gadgets"; closing mechanism runs in oil. Bucket opens by gravity; no power waste in closing. No headroom lost for closing. Simply hook on and plug in; 10 minutes to hook or unhook. Write today for a copy of our new, well illustrated BULLETIN.

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Designers and Builders of All Types and Capacities of Electric Overhead Traveling Cranes and Hoists and Electric Revolving Cranes

(*Concluded from page* 286)

factory service in the field, and were available in quantities at the times needed in the production program. Efforts should be made to provide alternate specifications which will simplify production problems when emergencies prevent adequate production of certain types of materials and components. Specifications also should be concerned only with physical properties and in no way should include chemical specifications. The foundrymen should give the service requirements on the casting and should be permitted to make this casting with the materials which are available. "There are probably dozens of ways of making iron to the same physical specifications."

In closing, the presiding officer indicated that the committee would meet again before early 1947.

DIELECTRIC BAKING OF CORES

(*Continued from page* 116)

The unit employs a fan to pull out steam and prevent condensation in the oven.

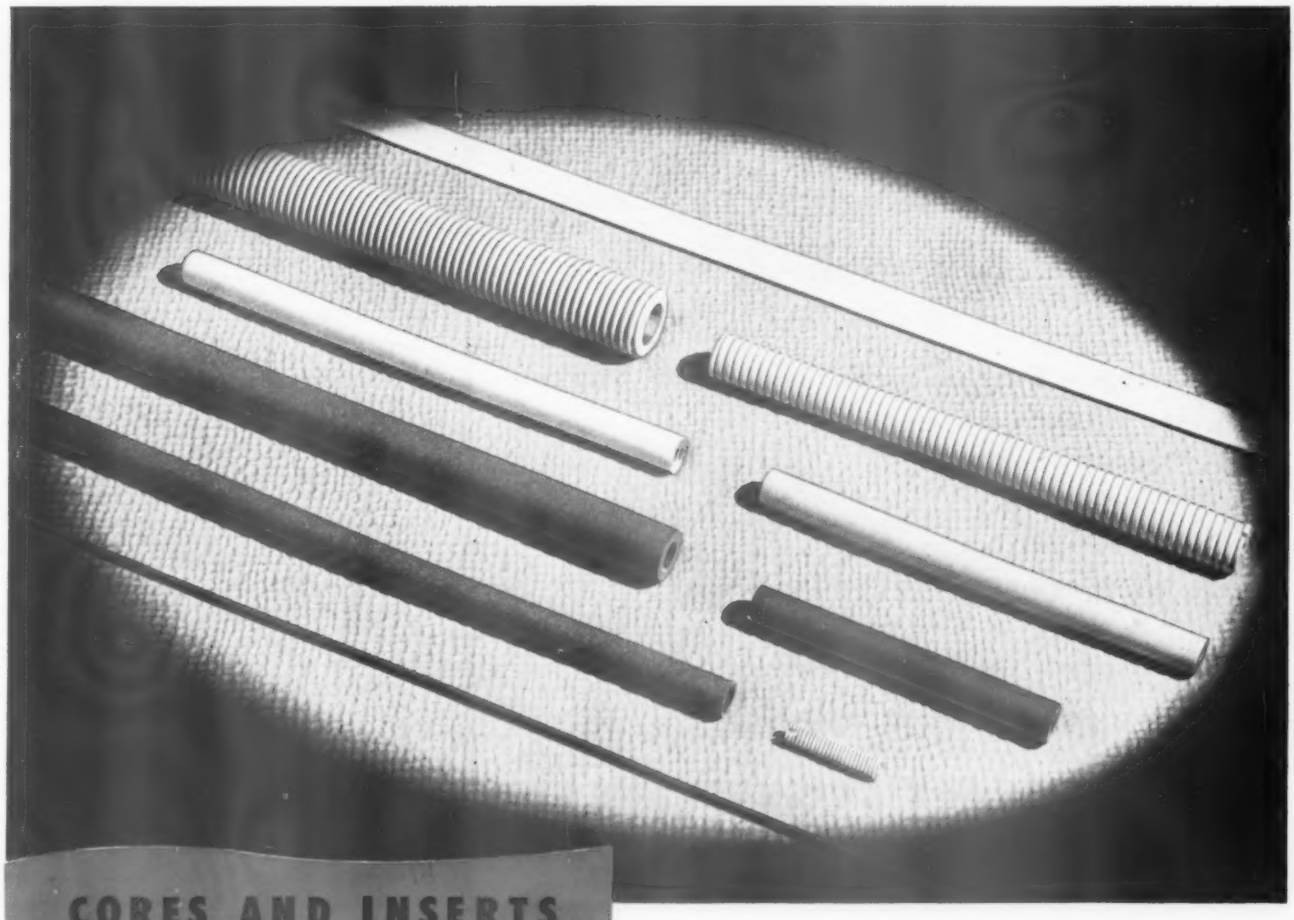
The question of comparative cost naturally is important, but since this dielectric process has been in actual production only a limited time, complete figures are not available which will afford a true picture applicable to any foundry. However, a unit capable of baking 360 pounds of cores per hour is said to require a power consumption of 25 kw.

If a plant ran 24 hours a day, using two such heating units having a power output of 12 kw each, it could produce 8 to 9 tons of baked dry-sand cores at a power cost of only $12. Maintenance is said to be low, based on experience with similar heating units in other industries. The original cost is not out of line with that of other types of modern baking units.

One of the problems to be faced is the production of irregularly shaped cores. Most of the work actually produced to date has been limited to flat cores, but it is possible to so curve the top electrode (a wire mesh screen) so that heat is evenly applied to thick and thin sections.

The secret of the speedy baking of cores by dielectric heating lies in the adaptability of newer-type dry core binders based on synthetic resins, plus synthetic curing agents. This dry material is added to the sand and mixed dry for 2 minutes, then water is added and mixing continued for 1 minute. The core mix is then ready for use. One formula which has been used successfully in a large steel foundry which first co-oper-

(*Concluded on page* 290)



CORES AND INSERTS for PRECISION CASTING MOLDS

Illustrated above: Cores are produced economically to commercial tolerances. Round, extruded cores or tubes can be centerless ground to accurate diameters and a high degree of straightness at reasonable cost. Threads and certain intricate shapes can be successfully cast in many metals too hard for practical machining. Bottom rod is .059 OD ± .001 and 18" long—heretofore considered impossible in technical ceramics. *Restricted cores and inserts are not illustrated or sampled.*

Modern precision casting continues to find new and advantageous uses for AlSiMag high fired technical ceramic cores and inserts. In collaboration with precision casting engineers, American Lava engineers have evolved the only presently known, practical cores and molds for some unusual and difficult products. Subject to ethical and military limitations, our engineers will be glad to work with you on your precision casting problems.

AlSiMag is the trade name of the many technical ceramic bodies developed by American Lava Corporation. Cores and inserts of AlSiMag are held to close tolerances. They are unaffected by the heat of the pouring, are removed either mechanically or by dissolving with a common chemical. Cost considerations will normally limit their use to shapes which can be extruded or pressed, and thus produced to commercial tolerances in large volume at low cost. More complex shapes, unusual sizes, and closer than commercial tolerances sometimes can be produced at costs which make their use practical.

American Lava Corporation engineers will be glad to consult with you on the possibilities of this modern material for your precision casting problems.

AlSiMag

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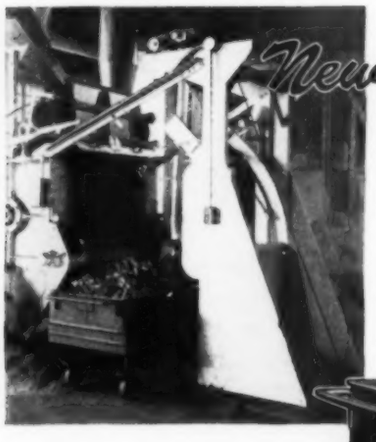
- Metallurgical Control and Standardization
- Methods for Increasing Production and Reducing Costs
- Foundry Management Counsellors

STANDARDS—INCENTIVES—METHODS—EVALUATION.

W. G. REICHERT ENGINEERING CO.

1060 Broad St., (Industrial Bldg.) • Newark (2) New Jersey



HEAVY-DUTY TRUCK!

Solves Your Casting Transport Problem!

Here's a heavy duty, all-steel truck capable of carrying a TON of castings. Ideal in connection with Wheelabrator, Roto Blast or similar installation. Husky, reinforced, welded construction. Roller bearing equipped wheels. Ball bearing swivel casters permit short turning radius. Ask for Circular No. 52.

Look to Sterling for all-steel foundry flasks — flask pins — hardened steel bushings — core plates — bottom boards — bands — upsets — hardwood wedges — — wheelbarrows — core trucks — slag buggies, etc.

***Sterling* FOUNDRY EQUIPMENT**

STERLING WHEELBARROW COMPANY • MILWAUKEE 14, WIS., U. S. A.

(*Concluded from page* 288)

ated on plant development work and then put this process on a production basis is: 400 lb 60-70 mesh Widron sand, 20 lb dry binder and 8 qt water.

Early development work in that foundry included 5 per cent silica flour and ½ per cent cereal in the mix for smoothness and strength, respectively. As work progressed the cereal binder was not deemed advisable, and later the silica flour was dropped, bringing the formula down to its simplest elements.

This large foundry was pouring aluminum-nickel-cobalt (Alnico) alloy at 3200 F. The practice there was to stack dry sand moulds, clamping a number of them together with sprue and riser at the top, as shown in Fig. 1. Upon pouring, the castings are formed in the sand mold without a flask to bind the molds together. This indicates the high hot strength of the cores. Their tensile strength is also high, as evidenced by the stacking of the core, and the fact that some having a small dowel can be lifted (5 lb weight) by holding the raised section.

Molds in this foundry are made on machines and taken to the dielectric oven where they are cured rapidly. The time will depend on electrical input and size of core. They are then stacked on the pouring floor. Thus, delays between core making, baking and pouring are reduced to a matter of minutes. Castings needed quickly can be made and cured in some 20 minutes from sand to finished work. Breakage is minimum, and finish is good, meeting and exceeding the foundry's expectation.

To sum up, the following advantages have been proved in the use of thermosetting resin binders baked dielectrically.

1. Perfect control of time and temperature. No underbaking or overbaking.
2. High production rate due to speed of process.
3. Good green strength without necessity of using cereal.
4. No objectionable odor or smoke.
5. No gassing, thus eliminating blowholes.
6 High surface hardness and tensile strength.
7. Easy shake-out; good collapsibility. A cleaner casting free from cracks or strains. Less rejections.
8. No lengthy cool-off period required.
9. Cores baked dielectrically hold to required dimensional tolerances.
10. Low labor cost.

So far as can now be determined, the process has immediate appeal for foundries having a volume of standard size cores of fairly regular dimensions. The adjustments necessary to handle a wide variety of sizes are still in the development stage, but are deemed feasible.

The PATTERN SHOP

Pete the Pattern Maker says:

"The trouble with champagne is that it makes you see double and feel single."

★

The Efficient Fillet

If the current lumber and leather shortage is making itself felt in your wood and leather fillet stock, here's a superior replacement item that will give you many new and better advantages. MASTER Bull's-Eye Fillet will help you cut initial cost; save time and labor; get closer accuracy; and build durability into patterns.

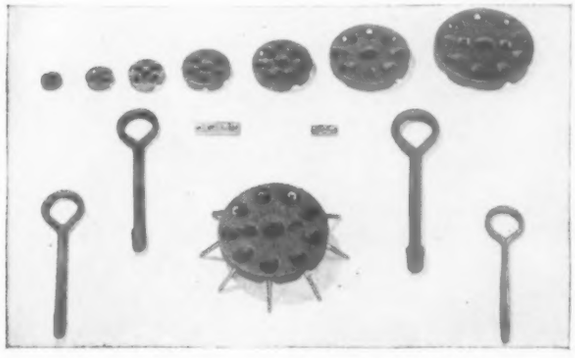
A piece of ¾" radius MASTER Bull's-Eye Fillet in use. No snipping of edges to secure a true radius.

MASTER Bull's-Eye Fillet offers the patternmaker more service per dollar of cost than any other fillet manufactured. It is comparable to leather in durability, is superior in adaptability, and sells for less than half the cost. Its economy is increased by its ease of application and consequent time and labor saving. It is made of a plastic material covered with a tightly woven cotton cloth which is cut on the bias, and therefore fits around sharp curves without snipping the edges. Highly accurate in size and shape, it maintains a true radius and a clean face in the most complicated work, fills corners perfectly, and holds its shape indefinitely. Bull's-Eye Fillet is applied in the same manner as leather, preferably with MASTER Waterproof Fillet Cement. Its absorbent cloth covering bonds with the pattern coating and presents a hard, smooth, oil and water-resistant surface. Although it has a high melting point and can be used safely in production work, it is not recommended for use in extremely hot sand. However, Bull's-Eye will stand the grind of hundreds of castings and will not deteriorate in storage. Write for descriptive literature or send for a trial order which we can ship immediately from stock.

NEW Master Rapping Plates

You'll get a better quality of work—at reduced costs—by standardizing on the new MASTER Rapping Plates in your foundry. They assure these quality features:

1. **Applied in less time.** The 1° taper on the side assures a tight driving fit.
2. **Thicker,** consequently they have greater contact surface on the wood for solid anchorage.
3. **Diagonal screws** give considerably more holding power than if screws were driven in straight. This diagonal direction also permits the use of longer screws in the same thickness of wood.

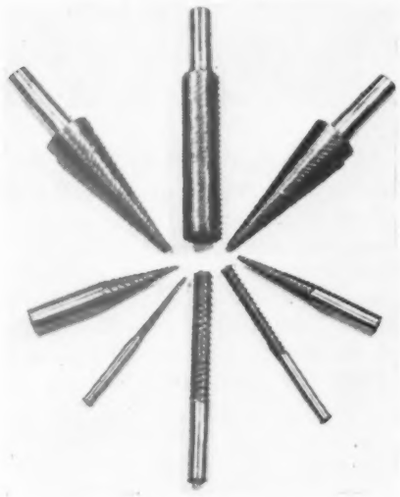


4. **Longer life**—cast from high-grade malleable iron.
5. **Will eliminate,** to a large degree, the presentday maintenance cost of Rapping Plates. If screws come loose through continued hammering, the old screws can be extracted, the Rapping Plate given an eighth of a turn, and all new screw holes will again anchor the plate as tight as it was originally.
6. **7 sizes**—from No. 0 to No. 6 inclusive in sizes from 1" diameter by 5/16" thick to 5" diameter by ¾" thick—to cover most Rapping Plate applications.

Write for full size detail blueprint of all MASTER Rapping Plates and Lifting Screws.

MASTER Milling Cutters

A new line made especially to Kindt-Collins specifications, of high speed tool steel, ground after hardening. Cut clean sharp chips in hard or soft woods, and in soft metal—no dust. Cutters available in various shapes, diameters and tapers, ranging from ¼" to 1" diameter, 1½" to 3¾" long, with 0-2-5-8° taper. Can be reground many times, always assuring sharp, hard, tough cutting



edges. Improve the quality of your cutting and finishing jobs—write for MASTER Milling Cutter prices and details.

MASTER Aluminum Solder

This is a scientifically prepared solder, made according to a formula that assures unusually strong adhesive qualities. Thorough, scientific mixing makes this solder absolutely uniform throughout each bar, as well as throughout different mixings.

MASTER Aluminum Solder works easily, and incorporates readily with aluminum castings. Highly recommended for all kinds of aluminum soldering. Write for prices and valuable recommendations for use of MASTER Aluminum Solder.

MASTER Pat-Kote Literature

New folder describing 7-way superiority of this new pattern coating. Also shows complete color chart. Write today!

KINDT-COLLINS MASTER PRODUCTS

THE KINDT-COLLINS CO.

Everything for the Pattern Shop

12651 ELMWOOD AVE. • CLEVELAND 11, OHIO

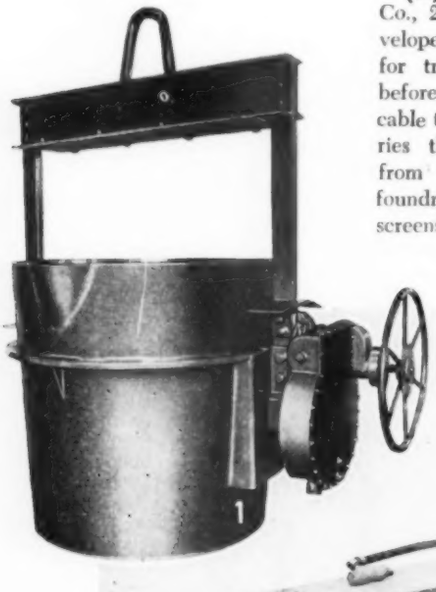
New EQUIPMENT and SUPPLIES

(1)—Ladle: Whiting Corp., Harvey, Ill., is introducing a new line of all-welded ladles said to incorporate longer life, greater safety and easier handling. Trunnions are welded to channel-shaped members which permit air circulation and eliminate eventual distortion of trunnion shafts. Self-aligning anti-friction type trunnion bearings are enclosed in shot and dirt proof housing and are also protected by shot guards. A new style gear bracket eliminates backlash, and turning the hand wheel operates a bellcrank which, in turn, motivates a reciprocating type oil pump, forcing oil to bearings and other moving parts.

(2)—Trap: Claude B. Schneible Co., 2827 25th St., Detroit 16, has developed a unit, called the Velocitrap, for trapping heavy particles from air before it enters a dust collector. Applicable to a number of industries, in foundries the equipment recovers abrasives from casting cleaning operations and foundry sand from downdraft shakeouts, screens, mullers and sand conditioning systems. Solids are separated by a slot-shaped opening in an elbow of the duct within the unit, the particles being expelled by centrifugal force and deposited in a hopper. The trap is made in four types and in a wide range of sizes with capacities from 2000 to 20,000 cfm. It is adapted to any wet or dry-method dust collector.

(3)—Molding Machine: Johnston & Jennings Co., 877 Addison Rd., Cleveland 14, has designed a new portable jolt squeeze molding machine featuring a one-piece cast steel squeeze frame operated entirely by air. A single valve controls all operations. Only two bearings are used in the squeeze frame. Squeeze cylinder diameter is 12 in.; jolt cylinder diameter 5 in.; table size 18 x 22 in., and air intake ½-in. Rubber guards on the squeeze head protect patterns, and the head is adjusted quickly for different height flasks.

(4)—Coreblower: Wm. Demmler & Bros., Kewanee, Ill., announces a low-cost coreblowing machine for the production of cores weighing up to 3 lb. Designed for quick adjustments it is especially adapted to short run jobs and is capable of blowing up to 200



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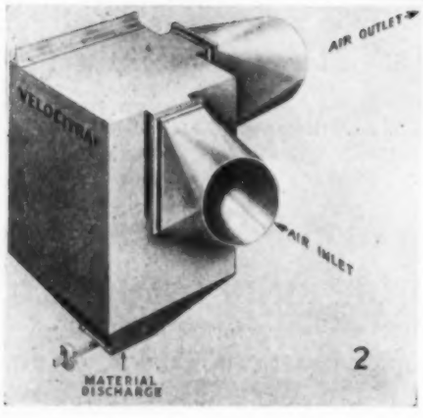

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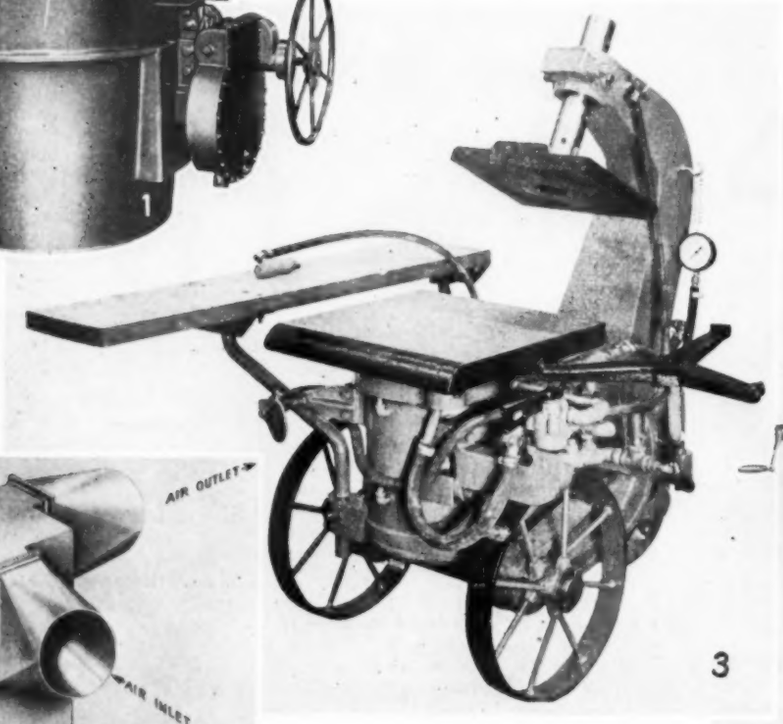

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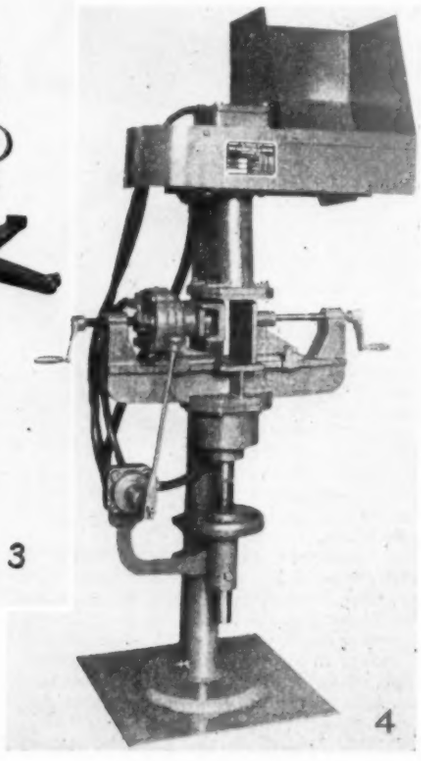

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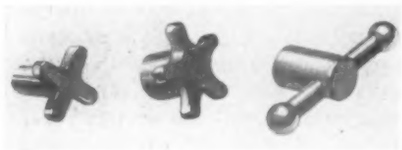
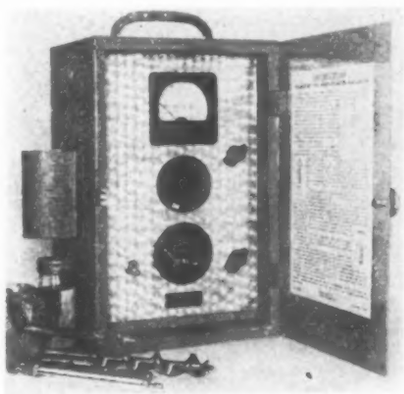
cores per hour. The unit is equipped with both vertical and horizontal, automatically operated air clamps, a single hand valve clamping the corebox and blowing the core in one operation. Column of the machine serves as an air reservoir. The sand magazine, 11 in. deep with a 3 x 5½ in. opening, is filled with sand by pushing it to register with the sand supply hopper. Maximum corebox depth the unit will accommodate is 10 in. Table height is adjustable between 30 and 36 in.

Hand Knobs: Machine Products Corp., 6777 East McNichols Rd., Detroit 2, offers three new types of hand knobs



for machines, fixtures, and other uses, made of gray iron, the hand wheels are available as rough castings or machined, and in variety of sizes.

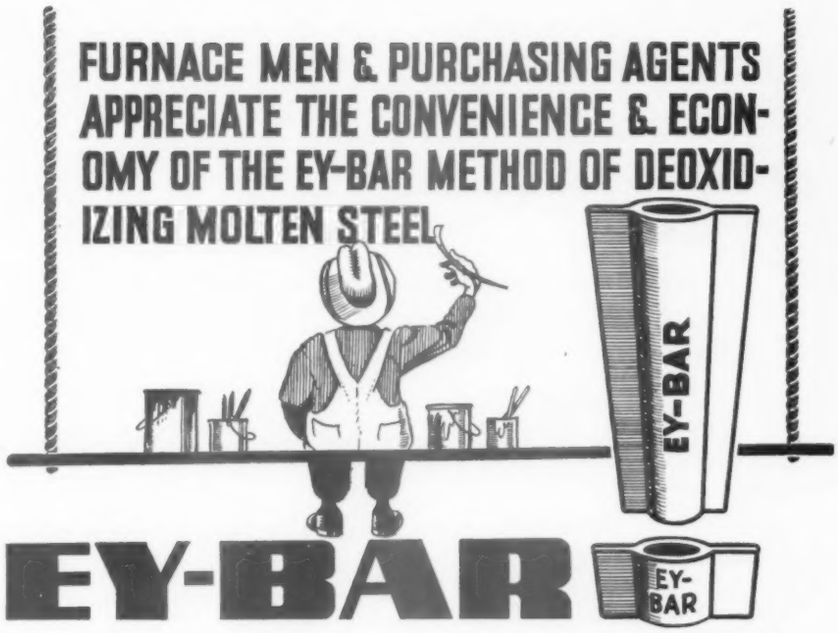
Moisture Meter: J. Thomas Rhamstine, Box 289, Harlingen, Tex., has adapted its soil moisture meter, which indicates quickly the available moisture in all types of soil, to use in foundries for determining moisture con-



tent of sand. Instruments and battery are housed in portable steel case into which the search coil and cable are plugged. Specifications: 9 x 6 x 13 in.; weight including battery, 20 lb; weight of auger, guard, search coil and coil weight, 6 lb; battery, 6 volt.

Welding Rod: Linde Air Products Co., unit of Union Carbide & Carbon Corp., 30 East 42nd St., New York 17, has developed a new flux-coated bronze welding rod for oxy-acetylene application. Precoated with flux in proper proportion to its size, plus a nonactive

FURNACE MEN & PURCHASING AGENTS APPRECIATE THE CONVENIENCE & ECONOMY OF THE EY-BAR METHOD OF DEOXIDIZING MOLTEN STEEL



EY-BAR is a scientifically designed casting of a metallurgical grade of aluminum. EY-BARS come in various grades, and their proportions are such that they will melt evenly and quickly, regardless of size. Made with standard tapered holes, they can be wedged on the end of a long steel bar and immersed in the melt in furnace, ladle or stream. They enable the furnace man to control exactly the amount of *effective* aluminum he wishes to add to his melt. They come in any size from 1 to 30 lbs, and from Grade I to Grade IV.

Member Aluminum Research Institute

THE CLEVELAND ELECTRO METALS COMPANY
2391 W. 38th ST., MELROSE 5435, CLEVELAND, OHIO

"The best investment we ever made!"

How one "cheap" Nozzle equalled the cost of 5 American Nozzles

An American Heanium Nozzle recently gave 525 hours' service on a sand blast machine at the Reliance Bronze & Aluminum Foundry Company, Philadelphia. A "cheap" nozzle gave only 15 hours' service on the same job. Reliance reports: "the cost of the cheap nozzle used for 525 hours would equal the cost of about 5 of your American Heanium Nozzles." No wonder Reliance calls the American Nozzle "the best Investment we ever made!"

American Heanium Nozzles, together with their companion nozzles, American Norbide and American V-Metal, give you many hours of efficient, hard-wearing service. They keep compressed air costs low, cleaning effectiveness high. Made in flange, screw base, and special types, American Nozzles also afford a selection in all price ranges.

Get the news on the better air blast nozzles — write for the new American Nozzle Catalog. Complete data on types, sizes and service performance of American Nozzles.

American FOUNDRY EQUIPMENT CO. 505 S. BYRKIT ST., MISHAWAKA, IND.

NORBIDE HEANIUM V-METAL NOZZLES

FREE BREATHING without DANGER or DISCOMFORT

. . . that's workers' experience with CESCO Respirators

No. 94 Healthguard Respirator

Efficiently filters out lead, silica and nuisance dusts, through throw-away paper filters. Speaking diaphragm permits normal conversation. Pliable, seal-tight rubber with broad easy-resting facial contact for comfort; adjustable head-bands. Bureau of Mines Approval, No. 2116.

● For protection from dust or fumes . . . prescribe CESCO Respirators for your workers.

Your prescription is supported by two important advantages: First, CESCO Respirators permit *free breathing*, at the same time giving workers *full protection* from dust and fume dangers. Second, CESCO Respirators are worn with minimum interference with normal comfort—every possible comfort feature is incorporated into CESCO products.

This combination—assured safety and maximum comfort—makes CESCO Respirators especially popular with wearers. That's why your best buy is CESCO.

No. 95 Fume Respirator

Cartridge-type respirator for protection from light gas and vapor concentrations. Rubber face cushion shapes to varying facial contours, provides air-tight seal, comfortable fit.

No. 80 Dust Respirator

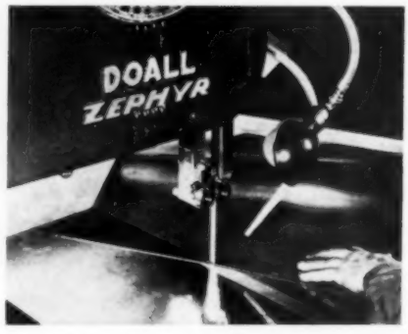
Lightweight diaphragm-type dust protector; contains large, quickly-changed filter pads. Made of molded rubber, with replaceable, soft cloth facelet.

CHICAGO EYE SHIELD CO.
2336 Warren Boulevard
Chicago 12, Illinois

CESCO
FOR SAFETY

binder that does not affect the weld, the coating adheres to the rod, melting down into the molten puddle without burning off ahead of the rod, which can be heated and bent without destroying the coating. Flux melts into the weld continuously, leaving no wasteful residue on face of the weld. Thorough tinning continues without interruption.

Sawing Machine: DoAll Co., 1301 Washington Ave. South, Minneapolis 4, announces a high-speed metal-cutting band saw designed primarily for light gage steel and foundry application



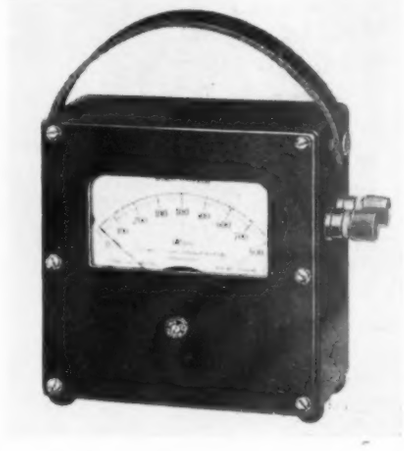
and applicable to woodworking and pattern shops. Fast cutting of sheet steel, aluminum, ferrous and nonferrous castings as well as paper, wood, plastics, laminates and composition matrials are accomplished by combination of controlled saw speed and special saw blade. Table of the saw is of the tilting type, and a disk cutting attachment for making perfect circles, a rip fence, and a mitering attachment for cutting of regular and compound angles, are other features. The new model has a 16-in. throat depth, a 10-in. thickness capacity and an infinitely variable speed range from 1000 to 5000 fpm.

Air-Gas Mixer: Industrial Division, Bryant Heater Co., 17825 St. Clair Ave., Cleveland, announces a new constant-ratio mixer for low pressure air and gas which utilizes the air at pressures up to 3 lb. Available in pipe sizes from ¾ to 4 in., the mixer's efficiency is due to improved design of internal contours and proportions, with resultant reduction of pressure losses within the unit. Gas ratio adjuster is a universal type, suitable for any type of gas. Gas from 550-3200 Btu can be handled with no change of equipment necessary in case of change-over. Device is easily adjusted, and may be sealed at any particular setting, if desired. Air sleeve may be removed from assembly without disturbing any piping, making insert accessible for changed capacity or cleaning. Either straight or 90° air sleeves are available.

Brazer: Westinghouse Electric Corp., Box 868, Pittsburgh 30, announces a new portable 5 kva brazer, weighing only 30 lb, for making lap joints in copper strap, attaching terminals to cable, brazing coil ends and general copper smithing work. The unit consists of a transformer, voltage, selectors, controls, and carbon-tipped tongs, and requires connection to a 220-v source. Alternating current from an adjustable voltage transformer passes through tongs and parts to be brazed, raising temperature to a point at which brazing alloy melts. Brazing alloy may be applied in rod or in ribbon form. Three outlets are provided on control panel for 8, 6 or 4 v.

Electronic Controller: Wheelco Instruments Co., 847 Harrison St., Chicago, has developed a multronic capacitrol, a multi-position electronic pyrometer controller, to meet applications requiring instantaneous, accurate indication and control of temperature, voltage, current, signaling and similar variables in process industries. It provides conventional on-off control at one or two different points, control of two separate fuel systems on a single pot or other heat treating type furnace, automatic positioning control for electric, oil and gas-fired equipment, or on-off control plus automatic fuel shut-off, or multi-signaling at two points or two signals at dual points.

Pyrometer: Illinois Testing Laboratories Inc., 420 North La Salle St., Chicago 10, announces a compact, lightweight, portable pyrometer for laboratory and general industrial uses. Heavy gauge sheet steel case provides magnetic shield-



ing, so that pyrometer may be used on steel top table, near other magnetic instruments, or in strong alternating fields without experiencing errors in readings. The instrument is available as a single circuit pyrometer with a choice of ten scale ranges, 0-400 to 0-3000 F, and as a double or triple range unit built to order with scales as specified. Centigrade scales can be furnished.

Hand Truck: Rapids - Standard Co. Inc., 108 Peoples National Bank Bldg., Grand Rapids 2, Mich., is introducing a hand truck with new features which include a plate nose 7½ in. long for better handling of cases, bags, and kegs; an arc-welded one-piece frame 14½ in. wide, and free-rolling pneumatic wheels which

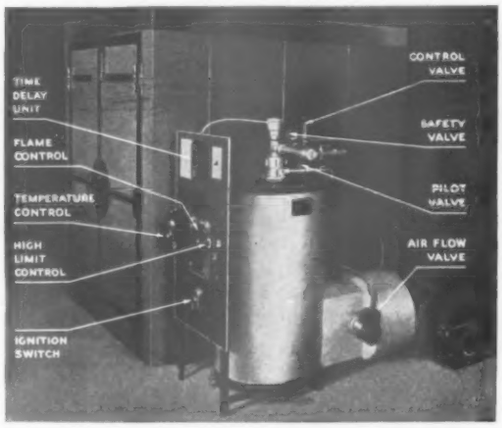
reduce floor maintenance costs, cargo spilling and breakage caused by joltage. Tires are 2-ply, size 10 x 3.50, with tread of 2⅛-in. Recommended capacity of each wheel is 250 lb, with a 35-psi air pressure in the tire. Less air pressure may be used to give greater shock absorbing qualities. The trucks have an overall height of 46 in., overall width 20 in., and move a 500-lb load with ease.

Vision Checking: American Optical Co., Southbridge, Mass., has developed a new sight-screener which can be carried into plants and factories for checking visual performance of em-

ployees. It is to be used in connection with a new vision-checking program recently developed. Data on 14 different visual functions can be obtained through use of the instrument in three or four minutes. From this information the doctor in charge of the program determines need for eye care as it affects the job. The new plan for promoting industrial safety includes the development of

3 factors of efficiency in LANLY OVENS

1. Compact, well insulated, direct-fired Air Heater of the atmospheric pull through type. Highly versatile as to adaptability.



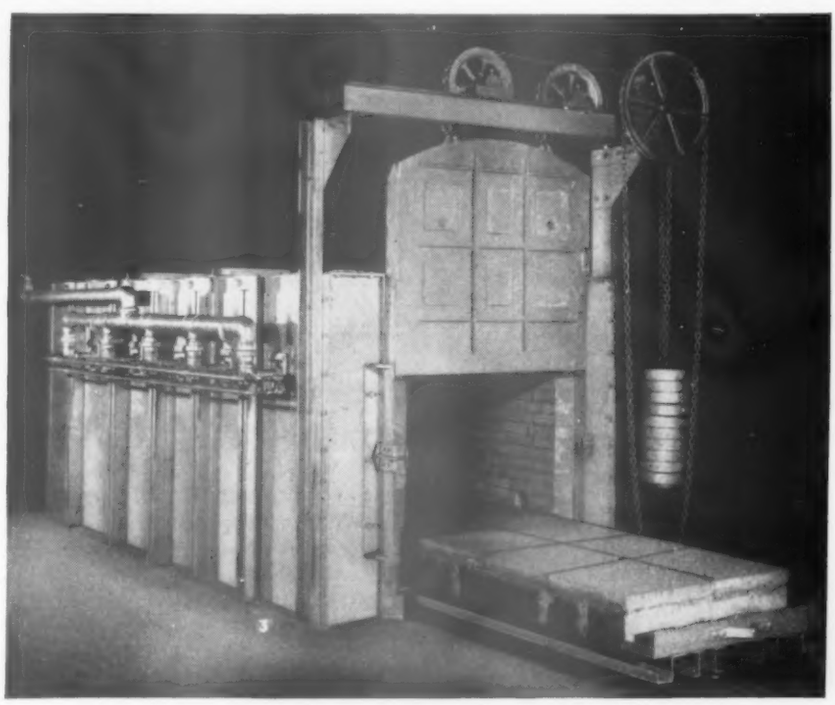
2. Full complement of scientific devices to assure safety, economy of fuel and close control of temperature.

3. Balanced Air System handling fresh and recirculated hot air. Large and small cores baked uniformly.

THE LANLY CO.
OVENS FOR INDUSTRY
HEATED BY GAS, OIL, ELECTRICITY OR STEAM
750 PROSPECT AVENUE • CLEVELAND, OHIO

CARBOTTOM FURNACE particularly adapted to handling large castings. As designed by Bellevue engineers highly efficient and economical and subject to very accurate temperature control with automatic proportioning burner equipment. In comparatively small model shown, miscellaneous castings and forgings are heat treated. . . . Car type furnace can be had in various designs . . . over firing . . . under firing . . . recirculating type method.

Bellevue INDUSTRIAL FURNACE COMPANY
2971 BELLEVUE DETROIT 7, MICH.



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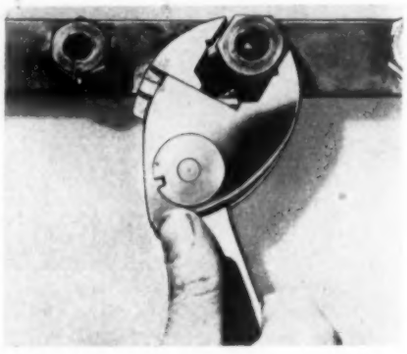
PROPELLAIR INC.
SPRINGFIELD · OHIO

visual programs designed to meet specific needs of various industries, use of optical aids for increasing visual perception and establishment of eye protection standards for various types of works.

Wrenches: Oscar W. Hedstrom Corp., 4836 West Division St., Chicago, announces an automatic, adjustable, ratchet-action wrench, with instant thumb-trigger adjustment and automatic eye adjustment control that keeps jaws in constant grip on square, hexagonal, metric, and odd-sized nuts while handle is in



manual operation. Available in two styles, one utilizing a V-groove in jaws to grip corners and faces of nuts alternately for close-quarter work, and another with pipe wrench teeth for use on rounded nuts, the wrenches are also produced in three sizes: the 6 in., opening to 13/16 in.; the 8 in., opening to 1 in.; and the 10 in. wrench, opening to 1⅜ in.

Slide Rule: Charles Bruning Co. Inc., 4754-10 Montrose Ave., Chicago 41, announces a new 10-in. plastic slide rule, said to have remarkable dimensional stability. Precision graduations are not affected by temperature change, and glass indicator is mounted in polished stainless steel frame that holds it firmly in place. Graduations are precise and will not lose visibility through use. *A, B, CI, C, D, K, S, L* and *T* scales are shown on the rule, the *CI* scale showing numerals and graduations in red to provide ease of reading. Beveled edges of rule are graduated in inches and centimeters. Indicator glass is replaceable and tension on slide is adjustable. The rule is furnished with protective carrying case and simplified instruction book.

Furnace Door: William M. Bailey Co., Magee Bldg., Pittsburgh 22, announces a new water-cooled door for open hearth and heating furnaces, manufactured for all furnace sizes. Water cooled ribs divide the plastic refractory into easily cooled sections, adding strength to doors and eliminating warpage. Doors can be lined with plastic refractory by unskilled workmen.

Heat Block: Mine Safety Appliances Co., Braddock, Thomas and Meade Sts., Pittsburgh 8, is offering a heat block which provides a rapid and safe emergency source of heat for first aid use. The block is of lightweight metal with high heat-transfer value, encased in a special cover and containing a replaceable heat charge. Heat charge is a metal cylinder containing a newly-developed chemical compound. Charge is inserted in the block where it is activated by raising and releasing a spring-loaded lever, instantly creating a chemical reaction which evolves maximum safe, dry heat. The block weighs only 22 oz, measures 3½ x 4 x 1½ in., and may be fitted into industrial first aid kits, cabinets, dispensaries and field station units. It stores indefinitely without deterioration.

Photographic Paper: Eastman Kodak Co., Rochester 4, N. Y., announces three new industrial photographic papers which speed production of paper positives from engineering drawings, and enable extra-high quality blueprints to be produced. Known as Reflex Copy TXA, Linagraph Ortho TXA, and Linagraph Blue Sensitive TXA, the new papers are translucent, light weight and have a high wet and dry strength. They may be used in place of film negatives where rapid printing time in making subsequent positives is necessary.

Air Flow Indicator: Dollinger Corp., Rochester 3, N. Y., has designed an air flow indicating instrument for use in any air ventilating system, which supplies information which the ordinary type of draft gauge fails to indicate, namely, the percentage of maximum

flow being obtained at all times. The indicator shows loss of air flow from any cause. It is available in two models, for small capacity ventilation and for large capacity systems.

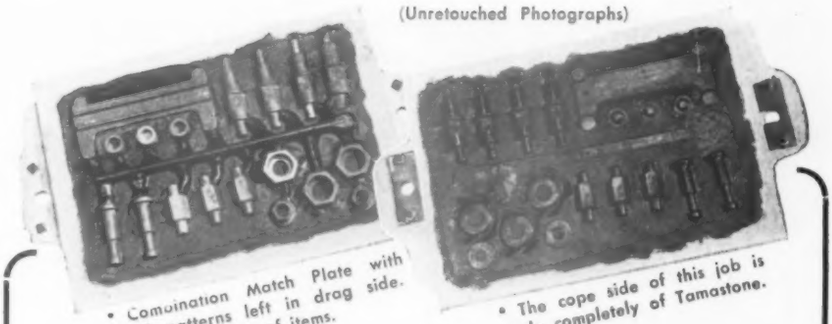
Motor Starters: Allis-Chalmers Mfg. Co., Milwaukee 1, announces a line of motor starters which provide short circuit protection for men, motors and equipment. The units are equipped with high capacity disconnecting-type power fuses, heavy duty, oil-immersed contactors with rolling-wiping action contacts, accurate motor overload protection, safety door interlock, and segregated high voltage compartment. Enclosure for starter is all-welded, heavy gage steel construction. Starters can be used with squirrel-cage, wound rotor and synchronous motors ranging in size up to 700 hp at 2300 v, and 1250 hp at 4160 or 4600 v.

Truck Boom: Elwell-Parker Electric Co., 4220 St. Clair Ave., Cleveland 14, has developed a lightweight power truck equipped with a horizontal, non-swivel type boom for lifting and transport-

ing loads up to 3000 lb. Suspended by a short length of chain, an object can be swung around easily for passage through narrow aisles or doors. Illustration shows how the truck may be used in transporting rough castings. Boom is available in lengths of 72, 66 and 60 in. from face of uprights. At lowest point hook is 22 in. above floor level; at highest, 8 ft. The truck is recommended for moving single, heavy and bulky objects to which a hook, chain, rope or cable may be attached. Boom may be made interchangeable with a platform whereby a variety of loads may be transported.

Conveyors: Lyon Metal Products Inc., Clark St., Aurora, Ill., has designed a line of gravity roller conveyors for handling and transportation of cartons, bales, boxes, crates and other types of merchandise. The conveyors are available in a variety of sizes: three straight sections all 10 ft long and in three widths, 12, 18 and 24 in.; three 90° curved sections, 12, 18 and 24 in. wide; two trestles, 18 in. and 24 in. wide. Each item is a complete unit, packaged and priced per piece. Regardless of width, the conveyors handle loads up to 200 lb.

(Unretouched Photographs)



• Combination Match Plate with metal patterns left in drag side. Note wide variety of items.

• The cope side of this job is made completely of Tamastone.

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BASIC PRINCIPLES OF CUPOLA OPERATION

(*Continued from page* 102)

reaction (a) will take place. The top of zone *O* is represented by the curved line *H-H* and it is assumed at this point all the available oxygen has been combined to form carbon dioxide (CO_2). We can then say that zone *O* contains $O_2+CO_2+N_2$ and incandescent carbon in the form of white hot coke. The top of this zone is lower in the center of the cupola because of its distance from the tuyeres and the tendency of the blast to creep up along the lining.

Above the line *H-H* another chemical reaction occurs to some extent indicated as reaction (b) $CO_2+C=2CO$ – heat. In this case for every pound of carbon consumed, 5850 Btu are absorbed. As heat is lost in zone *D* above the line *H-H* we can assume that the highest temperature reached is at the top of zone *O* represented by the line *H-H* where combustion has been completed but no heat lost by the secondary reaction (b). Zone *D* can then be assumed to contain incandescent carbon, carbon monoxide (CO), carbon dioxide (CO_2) and nitrogen (N_2). It extends upward to the line *M-M*, at which we encounter the first solid metal. Melting takes place from this point to a distance above, where the heat carried by the gases is insufficient to melt the lightest sections in the charge. The section of the stack directly above *M-M* is therefore usually known as the melting zone.

Zone Is Highly Oxidizing

The section from the sand bottom to *M-M* is the coke bed and as zone *T* is very highly oxidizing in nature and zone *O* also oxidizing, it is necessary to have all the metal melted before reaching these zones which contain free oxygen. The coke contained in the space above *H-H* to *M-M* can therefore be called safety coke and there must be enough to prevent any solid metal from reaching zone *O*. This safety coke is being constantly replaced by the coke splits placed between charges so that the minimum height from *H-H* to *M-M* must be the thickness of one coke split to prevent excessive metal oxidation.

Melting is accomplished by the sensible heat carried by the gases of combustion on their way up the stack and by radiant heat from the white hot coke bed. The drops of molten metal are then superheated by dripping through the reducing zone *D*, through the high temperature and slightly oxidizing zone *O* and a portion will drip through the colder and highly oxidizing zone *T* to be collected and blended in the well *W* as superheated metal.

A glance at Fig. 1 will show that metal which may have been charged at various points in the cross section of the cupola may be affected altogether differently in its descent through the cupola bed. For instance, a piece charged near the wall will have a short descent through zone *D*, a long distance through the oxidizing zone *O* and will fall right through the highly oxidizing and cold zone *T*. A piece charged near the center will have a long distance to travel through the zone *D*, a shorter drop through zone *O* and will miss the oxidizing zone *T* altogether. The first metal will be cold and show a very high oxidation loss of silicon and manganese. The second metal will show practically no oxidation and will be high in temperature before reaching the well. It will be noted therefore that in normal operation we are collecting metal of many degrees of oxidation in the well. The function of the cupola well is to collect and blend this metal to an average analysis, degree of oxidation and temperature.

Explanation Is Simplified

This explanation of the reactions taking place in the coke bed of the cupola is of necessity rather simplified in nature. It is doubtful if the actual reactions are so simple. There is a great deal of doubt as to the nature of combustion of solid carbon and it is probably gasified by hot air to form CO, which is then burnt to CO_2. However, the net result is the same. The boundaries between the various zones are not sharp lines but rather widely fluctuating bands with some CO found in zone *O* and some O_2 in zone *D*.

In the process of melting iron in the cupola we have a constant reaction between the molten metal, the slag, the refractories of the lining, the coke used as fuel, the air of the blast and the gases of combustion. For instance, a change in refractories will have an effect on the nature of the slag, which in turn will have more or less effect on the metal and very probably on the efficiency of combustion, which in turn will affect the metal temperature and in turn composition and physical properties of the metal being melted. Therefore, to get consistent operation it is necessary to hold as constant as possible, everything which may possibly affect the operation of the furnace. Such factors include height and burning in the coke bed, properties and size of coke, amount and distribution of coke in the coke charges, weight of pig iron and pieces of scrap making up the metal charge, distribu-

tion of the metal charge, amount and distribution of flux, contour of the lining and amount of air blast supplied. Even under the best of conditions we are maintaining a slightly precarious balance. If any of these factors get out of control it will throw the process more or less off the balance we are attempting to hold.

The two most important raw materials in cupola melting are coke and air. Probably most important in obtaining iron of consistent temeprature and physical properties is the foundry coke used as fuel, as the whole cupola practice is built around the coke. Most foundry coke used in the United States today is made in by-product ovens but there is a great difference in quality due to variations in coals, coking temperatures and general coking practice. The most essential property of a good cupola coke is consistent quality from car to car. A mediocre coke that runs consistent is far preferable to a better quality coke that varies from time to time, as any successful cupola practice must be built primarily around the coke used as fuel.

Coke Varies in Density

Quality of the coke governs the process of putting in the bed, the height of bed, proper volume of blast, speed of melting and type of charge needed to produce iron of given chemical analysis and physical properties. The generally used cokes vary far more in density and hardness or toughness of structure and in combustibility and reactiveness than in chemical analysis, and these variations mean far more in melting practice. Most cokes used in the Middle West will show well over 90 per cent fixed carbon, under 1 per cent volatile matter and under 8 per cent ash. However, the fact that two cokes run 92 per cent carbon or are of equal calorific value does not mean they will give equal results. Authorities do not agree on the properties most to be desired in a cupola coke, as the best combination of properties will vary with the type of cupola operation and dimensions of the furnace.

The effects of coke combustibility and reactiveness are very important in the process of cupola melting, for coke is the foundation of any successful cupola practice. Combustibility is a measure of the rate at which a given coke will burn in the presence of excess oxygen. Reactiveness is the property of reacting with the CO_2 of the blast with formation of CO and loss of potential heat. Both are much affected by the size of the individual pieces, as both are surface phenomena and small pieces present more surface area until the point is reached where blast penetration is effected. Unfortunately, these two prop-

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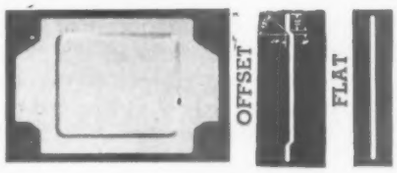

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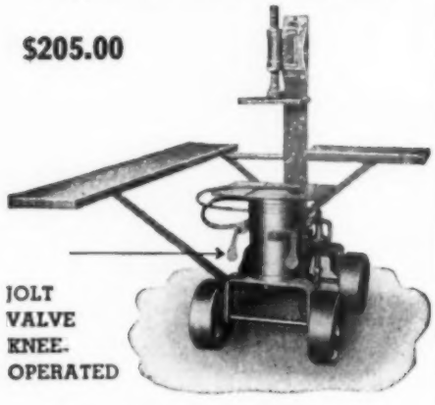

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erties of a coke tend to run more or less hand in hand; that is, high combustibility runs with high reactivity. A reactive coke wastes itself in the stack, as coke which does not reach the bed is useless for melting iron. On the other hand high combustibility tends to give a shallow coke bed of intensely hot nature. Such a bed means fast, hot melting and clean operation, also the ability to carry high blast without undue oxidation of metal.

A coke of lower combustibility tends to operate with a high bed of relatively lower temperature, raising the zone *H-H* higher in the stack. However, the iron may be tapped at just as high temperature, since heat picked up by the metal depends not only on the temperature of the coke bed, but also on the length of time necessary for the molten iron to drip through it. Such coke does not carry high blast well, there being a tendency for the free oxygen zone *T-T* to extend further into the cupola due to slower burning, and the formation of a bridge under high blast conditions due to the cold zone in front of the tuyeres. This colder zone may actually chill the iron dripping through it so that the effects of a high blast with such coke are oxidized metal, colder iron and excessive bridging. However, a coke which is not very combustible usually has the faculty of giving a low carbon pickup and is very useful in making higher strength iron of the lower carbon variety.

Coke Size Is Important

In our consideration of combustibility we should not neglect the effect of coke size. Assuming fuel of a certain combustibility, pieces of 3-in. size will burn faster than pieces of 6 or 8-in. It is now possible to obtain coke sized to very close limits but most of us are negligent in handling such coke after it is received in the foundry. It must be most discouraging for the coke manufacturer, who has taken every possible precaution to produce and ship material of close size tolerances, to witness the carelessness with which such coke is often handled after being received in most of our foundries.

The seriousness of this situation lies mostly in the fact that coke which has been handled in such a manner as to produce much deterioration in size will usually segregate badly in filling storage bins or hoppers. When we abruptly encounter large variations in size or percentage of fine material, we upset the bed conditions in the cupola and the result is nonuniform melting and a wide variation in analysis and temperature. It is possible to obtain good results from either relatively large or small coke, but the melting practice must be built around standard conditions.

Usually a dense, finely grained coke of high specific gravity will show lower combustibility and particularly lower reactivity than lighter material showing coarse cellular structure. In the past there has been a decided preference for coke of large size. This probably was because the methods of coking which tend to give good structure also give large full-sized coke with little cross fracturing, and small coke was apt to be of poor structure and to give poor results. However, since the advent of sizing equipment, this argument no longer holds good and, if it is properly handled, a good quality coke of medium size will probably give better and more uniform results than full-sized fuel, except in the largest stacks.

Unfortunately, when we mention coke bed heights in operating details we mean before charging is started. After the blast has been on for a period of time we have no way of knowing the height of bed in the operating cupola. It is undoubtedly changing somewhat with changes in coke size and makeup of the charge. We assume that the coke splits are sufficient to maintain our bed conditions. The practical operating man will observe certain phenomena which will show him to quite an extent the proportional bed height.

Decrease Slag Fluidity

Assuming proper charging with the correct amount of flux, a rising bed will be accompanied by loss in slag fluidity. The slag will become lighter in color and puff up if it comes in contact with water. There will tend to be quite a formation of wool blown from the slag hole and some tendency toward bridge formation because of the decreased slag fluidity. Naturally, the metal temperature will tend to increase and the iron will show lower chilling tendencies and probably more open fracture. At the charging floor there will be more tendency toward flame because of the combustibility of higher percentages of carbon monoxide in the stack gases

A falling bed will be indicated by increase in slag fluidity. The slag tends to become watery and darker in color due to higher percentages of manganese and iron oxides. The slag is also heavier, especially if it comes in contact with water. The speed of melting with constant blast will increase materially and eventually metal temperature will be lowered and chilling tendency of the metal increased. The metal fracture will become tighter due to increased oxidation losses. Usually the metal in a test ladle will show a different type of oxide flash on cooling and there are other indications which the observant operator will detect.

On long heats, the constant use of chill samples and an optical pyrometer, coupled with careful supervision of the charging floor, will help the operator to catch swings in bed conditions as they occur and, if necessary, to apply corrective measures before conditions become serious. The excellence of cupola practice in any shop is determined by the care taken in eliminating possible variables in practice or melting materials, and the skill exercised in diagnosing and correcting trends in cupola conditions.

Issues New Data On Eye Protection

Industrial Health Section of the Metropolitan Life Insurance Co. has prepared the fourth in its industrial health series, entitled "Methods of Testing and Protecting Eyesight in Industry." Reviewing the purpose and scope of industrial eye examinations, including job analysis, placement and rehabilitation of the visually handicapped, the study devotes a section to the procedure for setting up an industrial eye testing program.

Illustrated with testing charts and industrial visual record forms, the report describes various techniques employed for testing and measuring visual acuity. Basic principles of industrial lighting are explained, with fixtures used and various other factors to be considered in industrial lighting systems discussed. The study is available to executives from Policyholders Service Bureau, Metropolitan Life Insurance Co., 1 Madison Ave., New York 10.

Facilities of Steel Foundry Described

Scullin Steel Co. has issued a colorful 24-page folder, describing a conducted tour through its facilities in St. Louis. Beginning with a view of the administration building, home of the general offices and engineering department, the reader is then shown views of the various operating departments and laboratories. Balance of the book is devoted to illustrations of Scullin products, including steel anchor chain, turrets, side frames and bolsters for freight car and locomotive tender trucks and other locomotive parts, clutch cases for heavy duty tractors, and other large steel castings for Victory and Liberty ships, tankers and cargo vessels during wartime.

Federated Metals Division, American Smelting & Refining Co., New York, has completed arrangements with the Gardiner Metal Co., Chicago, to produce and market the entire line of Gardiner extruded solders.

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NEW TRADE PUBLICATIONS . . .

DUST CONTROL: American Air Filter Co. Inc., 266 Central Ave., Louisville 8, has issued a complete catalog containing over 20 bulletins describing air filters, dust control equipment and special products manufactured by the company. Three bulletins deal with atmospheric and process dust problems and their solution; with the importance of filtered air in modern ventilation and air conditioning, and with technical data and general information covering selection, application and installation of filters. Other bulletins describe various types of filters, precipitators, dust arrestors, spray booths, electric furnace hood and special units.

HYDRAULIC CYLINDERS: Logansport Machine Co. Inc., Logansport, Ind., offers Catalog 84, describing engineering developments and advance features of its new line of cast cylinder barrels, including automotive-type piston rings, high tensile cast iron and covers attached to barrel without tie rods, and ring seals which eliminate gaskets. The book gives complete specifications and engineering data on available cylinder types, suggests methods of application and gives helpful information for designing hydraulic circuits.

ALLOYS: Ampco Metal Inc., Milwaukee 4, has issued Bulletin 72, which dsecribes many new specialties offered by this company, such as resistance welding electrodes, mill products, continuous cast bearing bronzes, pumps and fabricated assemblies. Facilities for precision machining of castings and forgings are also described.

TRUCKS AND TRACTORS: Hyster Co., Portland 8, Oreg., and Peoria, Ill., has available Form 1016-25,000-1045SR, an illustrated 16-page bulletin which describes a 4000-lb lift truck on pneumatic tires, with trunnion steering, hydraulic mechanism for hoisting and tilting, and a simple and effective lifting cylinder. Another bulletin offered by the company, Form 1011-25,000-1045J, contains complete information covering towing winches, double drum donkeys for hoist service, tractor cranes for lifting jobs and a tractor which combines dragline, clamshell and crane in one unit.

MATERIAL HANDLING: Towmotor Corp., 1226 East 152nd St., Cleveland 10, has available a product data file which tells the complete story of its line of material handling equipment. Actual case studies of handling problems to save time, money, manpower and storage space in factories, warehouses and terminals, are covered in one folder. An analysis guide to aid factory and warehouse managers in determining need for better materials and methods also is included.

VALVES: Safety and relief valves to match improved designs of the latest power and process equipment are described in Catalog No. 45, recently issued by Farris Engineering Co., 400 Commercial Ave., Palisades Park, N. J. A pictorial index shows line drawings of basic types with uses, and directions for finding its specifications in the catalog.

BORON CARBIDE: Norton Co., Worcester 6, Mass., has published a colorful 12-page bulletin which describes its boron carbide product, Norbide. It is available in powdered form for machine lapping of cemented carbide wire drawing dies and tools, mineralogical specimens and hardened steel parts. In molded form its applications include a line of gages, nozzles, extrusion dies for abrasive rods, sleeves, mortar linings and pestle tips for laboratory use, masks for material to be sand blasted, molds for grinding wheels and other abrasive products.

FURNACES: Hevi Duty Electric Co., Milwaukee 1, offers Bulletin HD 1245 describing pit type convection furnaces. A cutaway view showing arrangement of parts is shown as well as installations for various uses. Complete details of arrangement, insulation, heating element construction, protective atmosphere, description of fans and control, are given in the bulletin, which also includes specifications of both the convection and non-convection pit type units.

PUMPS: Bulletin No. M45, recently issued by Marlow Pumps, Ridgewood, N. J., supplies complete data on its line of Mud Hog diaphragm pumps, originally developed for heavy-duty work in construction, but now used increasingly for handling heavy industrial wastes and residues. The pumps are available in 3 and 4 in. single and 4 in. double sizes, with capacities ranging from 3000 to 9000 gph.

PROTECTIVE FACING: Haynes Stellite Co., Kokomo, Ind., has published a 4-page folder describing a new facing designed to protect chemical plant and oil refinery equipment from corrosion. For relatively small areas, welding rods of the nickel-base alloy are used to cover the area with a corrosion-resistant deposit. For larger areas, thin sheets of the alloys are welded in place as a protective lining.

CLEANING CHEMICALS: "Plane Portraits," a 28-page booklet, illustrated in color, is offered by Turco Products Inc., 6135 South Central Ave., Los Angeles 1, to all interested in industrial cleaning problems. Technical data on corrosion prevention, paint removal, preparation of aluminum surfaces, engine overhaul, surface coatings, and cleaning of transparent plastics, together with photographs, in full color, of popular aircraft, are included in the book.

INDICATOR: Davis Emergency Equipment Co. Inc., 45 Halleck St., Newark 4, N. J., offers a circular which describes a small, portable instrument for indicating CO_2, stack temperature and draft readings. Specifications, a description of various features including safety

switch, portability, source of power, and accuracy, together with illustrations showing complete instrument and panel operating controls, are given.

FOUNDRY RESEARCH: A 20-page pamphlet, entitled "Industrial Research Progress at Armour Research Foundation of Illinois Institute of Technology, 1944-45," is available from the Armour Research Foundation, Chicago 16. It describes the organization's facilities and activities in foundry research as well as in other major fields of metallurgy, engineering, chemistry, physics, etc. Armour Research Foundation is a nonprofit institution established in 1936 to render a research and experimental engineering service to industry.

FURNACES: Bulletin No. SC-127, recently issued by Surface Combustion Corp., Toledo 1, O., describes case hardening by pack, liquid and prepared atmosphere methods and recommends ideal types of furnaces for the specific process. Bulletin No. SC-128, also offered by this company, covers radiant tube heating, used in both ferrous and nonferrous metal processing. Advantages of this heating method when applied to carburizing, carbon restoration hardening, annealing, etc., are brought out. A chart giving the available heat of artificial, natural, propane and butane gases is included.

POWER BRUSHES: Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland 14, has published a 24-page booklet on power brush usage and operation. Information contained covers selection of brushes, adjustments which can be made in specifications or operating conditions to achieve modified results and illustrations of actual power brushing operations. Tables which group various types of brushes and wheels, showing the brush number, approximate operating face width, wire diameter and brush trim length, are featured, and application notes referring to use of individual models and sizes.

ALLOY CASTINGS: National Alloy Steel Division of Blaw-Knox Co., Blawnox, Pa., has published Catalog No. 2041, which gives details concerning engineering aspects of alloy castings, including chemical and physical stability, creep resistance, ductility, wear resistance at elevated temperatures, thermal conductivity and expansion. The technique of Rotocasting is described. Rotocastings, produced by use of centrifugal force, are made in sizes from 2½ to 28 in. OD, in lengths up to 13 ft., with wall thicknesses ranging from ¼ to 2 in.

BLAST CLEANING: Catalog No. 264, published by American Foundry Equipment Co., 505 South Byrkit St., Mishawaka, Ind., describes a new airless blast cleaning machine with a capacity of 63 cu ft which will clean 6000 lb of steel castings in 15 min. Catalog contains installation photographs, construction features, overall dimension drawings and specifications of the machine, said to be the largest of its kind ever built.

CARBIDE TOOLS: Metro Tool & Gage Co., 4240 Peterson Ave., Chicago 30, has available a condensed 6-page catalog which describes a line of standard carbide tools tipped with general purpose grades for use on turning, facing and boring operations. Specifications and prices are supplied. Information is also included covering a line of masonry drills available for use in any rotary electric portable drill.

AIR HOIST: Keller Tool Co., 4605 Lake St., Grand Haven, Mich., has issued a bulletin featuring a new, lightweight portable air hoist, designed for lifting jobs in the ¼ and ½-ton capacity range. The bulletin describes operation and mechanical construction of the hoist which weighs only 30 lb, but has a lifting capacity of 1000 lb at 17 fpm and proportionately greater speeds for lesser loads.

SUGGESTION SERVICE: "HOW TO GET IDEAS," a folder describing suggestion system techniques, is offered by Elliott Service Co., 219 East 44th St., Dept. S 118, New York 17. Suggestions for building employee morale and fostering co-operation between employer and employee are offered as well as a description of methods for putting the suggestion program into effect. Display board, posters, display sheets, suggestion blanks, stimulator displays and working forms are described in the folder.

INDUSTRIAL STAMPS: WG-462, a new bulletin recently issued by the M. E. Cunningham Co., 97 East Carson St., Pittsburgh 19, illustrates and describes a line of safety wedge grip letter and figure stamps, multiple character stamps for straight line, curved line, concave and convex marking, and interchangeable steel type holders.

PROTECTIVE CLOTHING: B. F. Goodrich Co., Akron, O., has available a 10-page catalog section describing a complete line of protective industrial clothing. Pictured and described in the folder are vinyl resin coated work coats, double back industrial coats, work suits, plastic coated protective sleeves, workers' leggings, plastic coated acid-proof aprons for industrial and laboratory use, industrial rubber gloves and footwear.

WELDING LENSES: Eastern Equipment Co. Inc., Willow Grove, Pa., offers a catalog section, AWP-21, which describes and illustrates lenses for industrial eye protection. Included in the folder are welder's and chipper's lenses, lenses for smelting and furnace work, and nonglare lenses, impact resisting, for use in spectacle-type or cup-type goggles. Helmet filter lenses are also included in the descriptive matter.

FLOW REGULATOR: Waterman Engineering Co., 721 Custer Ave., Evanston, Ill., has prepared a descriptive circular, data and price sheet, which applies to flow regulators holding a constant rate of flow or specially designed valves to individual requirements where rate of flow varies with pressure. Data sheet accompanies the circular.

BUSHY FLAME dries large areas quickly—
Gets into hard-to-reach corners!

Gasweld **MOULD DRYING TORCH**

This light, easy-to-handle torch with a big bushy flame that can be easily directed to every corner of the mould, is the modern answer to drying large moulds quickly and efficiently. The bushy flame covers large areas or gets into corners with equal ease.

Operating on pressures as low as 4 ounces, these torches use natural or city gas in conjunction with compressed air. Ruggedly constructed, well-balanced and easy to handle, the torch weighs only 3½ pounds—does not tire the operator.

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A COMPLETE encyclopedia, a ready reference and a practical guide to sound foundry practice. In addition to a description of every conceivable type of gate and riser, the text covers the application and function of gates and risers to all sizes and types of castings. Illustrations on almost every page enable the reader to grasp the salient points with a minimum of study.

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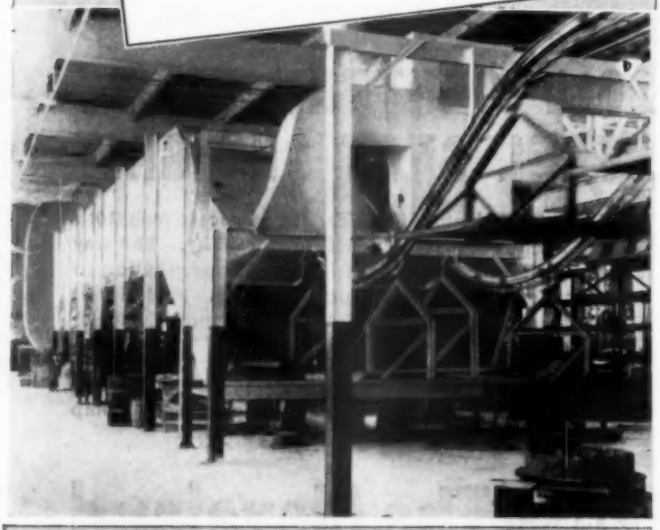
Older type ovens, if in good shape, can be modernized with properly designed Ross Heating Systems. Consult us on the possibilities. No obligation.



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Patented ball and socket connection between internal lever and the valve.
Double Grip
Inside of hose held by threaded shank—outside held by serrated ferrule.

Easy to Install

Just trim hose square. Slip ferrule over the end, insert Air-O-Chek and screw up.

Made to fit 1/4", 5/16" and 3/8" one- and two-braid air hose. In ordering specify exact inside and outside diameter of hose.

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• SIMPLICITY OF DESIGN
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Featuring double ball-bearing construction and efficient single-wheel mounting.

Grinding wheel rotates on double bearings around a dead shaft anchored at both ends—completely eliminating all vibration and shaft whip . . . and the entire unit guaranteed for two years!

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OLIVER BUILDING PITTSBURGH 22, PA.

HAYNES EQUIPMENT

● The post and squeeze cylinder on the HAYNES JOLT SQUEEZER is cast all in one piece. There are no bolts or screws in this machine. The top of the post is machined on top with a 2 7/16" cold rolled shaft which the swing arm swings on.

This is a portable machine with three wheels, two in front, one in back, zerk fittings on all moving parts. Comes equipped with air gauge, pop-off gauge and a pin on top of the arm for a gate horn.

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This machine is furnished in two sizes: 10" squeeze cylinder with 3" jolt cylinder and 12" squeeze cylinder with 4" jolt cylinder.

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Graded to the new S. A. E. specifications

Performance will prove you are right in selecting "Sure Shot" and "Par Grit" abrasives for blast cleaning. They're unequalled because they're scientifically heat treated by a special process which makes each pellet hard, uniform and tough. They clean faster . . . last longer . . . and do the job better. Our modern screening system guarantees accurate sizes graded to the new S.A.E. specifications. Write today for free samples and price list.

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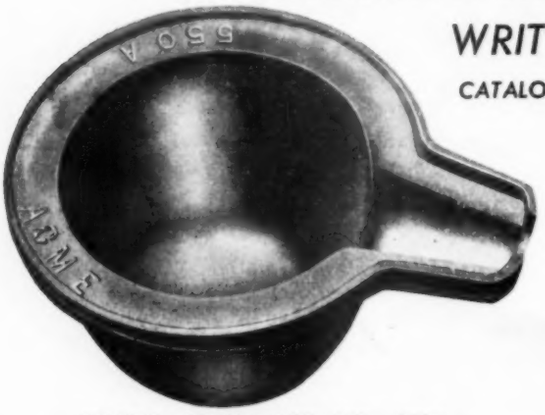
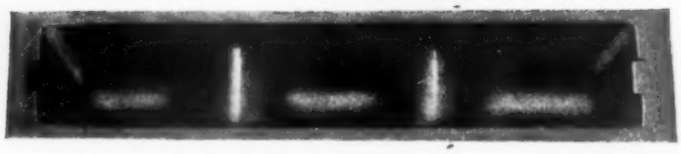


ROUND SPOUT POT NO. 550A
WITH 1¼" COLLAR ON FLANGE

WRITE for
CATALOG "F"

HOLDING BOWL NO. HP7001



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Made of Acme SPECIAL-M-Heat Resisting Iron — They Stand the Heat!

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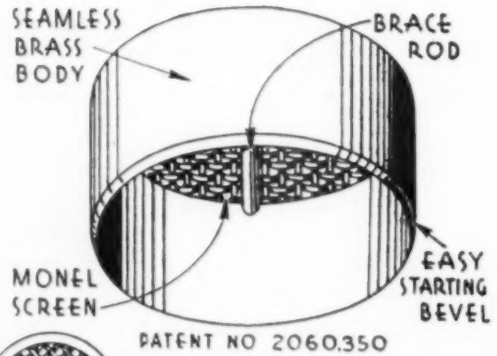

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Sinel Screen Vents, the original patented screen plugs, give maximum venting area with minimum hole size in the box. Our method of inserting the screen does not restrict the inside diameter and the resulting open area requires less frequent cleaning. Made in sizes to meet all needs. Write for complete information and latest price list.

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Eliminates casting rejects and saves labor, material, and production expense.

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A durable, colorful, coating for cement floors and surfaces.

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Its resistance to heat makes it a peerless coating for ovens & furnaces.

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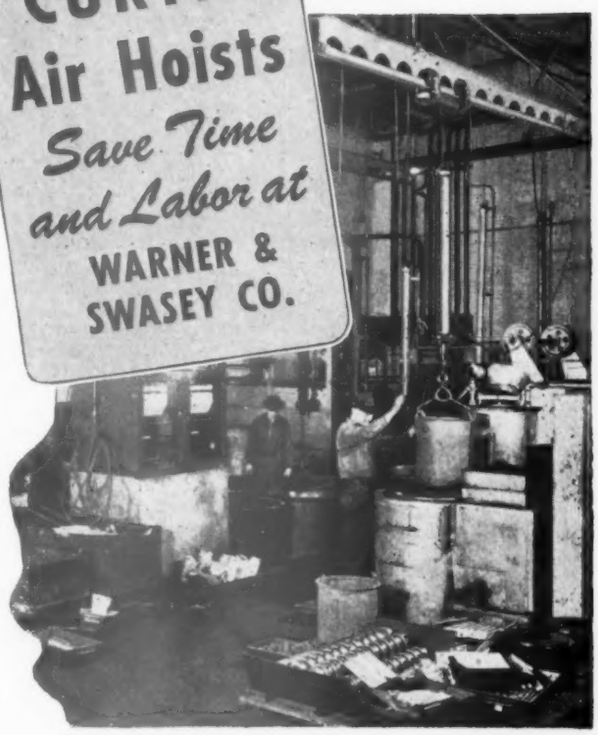
CURTIS Air Hoists *Save Time and Labor at* WARNER & SWASEY CO.



Curtis Air Hoist used in operating the Cleveland Tramrail System in the heat-treating department of Warner & Swasey Co., Cleveland.

It's another example of a well-known company relying on Curtis air-operated equipment to speed production, save time and labor, too. Curtis Air Hoists offer the following advantages to any company concerned with any lifting, pushing or pulling operation:

- **Low first cost — lowest operating expense.**
- **Smooth, fast, accurate control of load.**
- **One-man or one-woman operated.**
- **Finger-tip control.**
- **Light weight — pendant, bracketed or rope-compounded types.**
- **Cannot be overloaded.**
- **Capacities up to 10 tons.**

92 Years of Successful Manufacturing

Find out how Curtis Air Hoists, Air Cylinders and Air Compressors can save man hours, cut costs in your plant. Write for bulletin C-7.

H-490

CURTIS PNEUMATIC MACHINERY DIVISION
of Curtis Manufacturing Company
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Please send me Form C-7 on Curtis Air Hoists and Air Cylinders; also Curtis Air Compressors.

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Made in Colors
to conform to
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HARDLAC PATTERN COATING

1. Prevents Warping, Swelling, Deterioration—in use or on the shelf.

2. Protects against Damage from Oils, Greases, Waxes, Kerosene and Gasoline.

Here is the modern pattern coating that is daily preventing many costly pattern losses in leading foundries and pattern shops in all parts of the country. The big reason why Hardlac Pattern Coating does such a thorough job of protecting wood patterns is that it is a synthetic alcohol soluble varnish made especially for this job. Hardlac has all the good features of shellac, *plus*.

Easy to Apply, too!

Hardlac comes ready mixed—saves valuable time. Brush or spray it on—it dries quickly to a smooth even surface.

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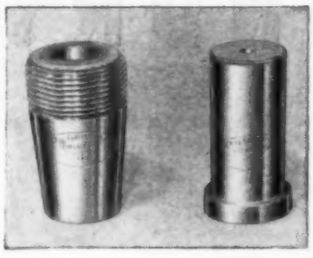
WHEREVER BLASTING IS DONE!



Wherever there is blast cleaning there ought to be a Federal Blast Nozzle. Made of cast tungsten-carbide (the hardest metal known to man) the Federal Blast Nozzle concentrates the blast, reduces air costs and outwears any nozzle previously offered for the purpose.

Being cast, the tungsten-carbide is pure—as is not the case when made by sintering.

The purity of the metal ensures long wear, reduces air consumption and guarantees concentration of the blast—all due to the extremely slow wear of the orifice.

Made in several sizes; adapters can be furnished to fit all makes of blasting equipment.

The Federal Foundry Supply Company
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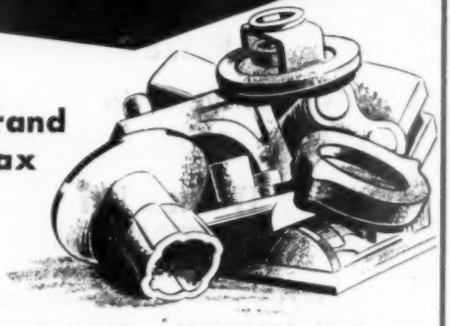
Prevent Core Blowing Losses Like These

with
Buffalo Brand Vent Wax



Foundrymen everywhere *know* the importance of providing proper vents in cores to allow quick escape of the gases when the molten metal is poured. That's why they save time, money and reduce discards by safely venting cores with *dependable*, low cost Buffalo Brand Vent Wax. Send for *free* sample.

Buffalo Brand VENT WAX
UNITED COMPOUND COMPANY
328 South Park Ave. Buffalo 4, N. Y.

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AMONG THE MANY TYPES OF BLAW-KNOX BUCKETS FOR FOUNDRY USE

You will find one designed for extremely low head room. The Single Line Hook-On type illustrated requires only 6 ft. 7 in. operating head room. Capacities range from ¾ to 4 cu. yds. . . . For detailed information on this and many other Foundry Buckets, just ask us for catalog 2002.

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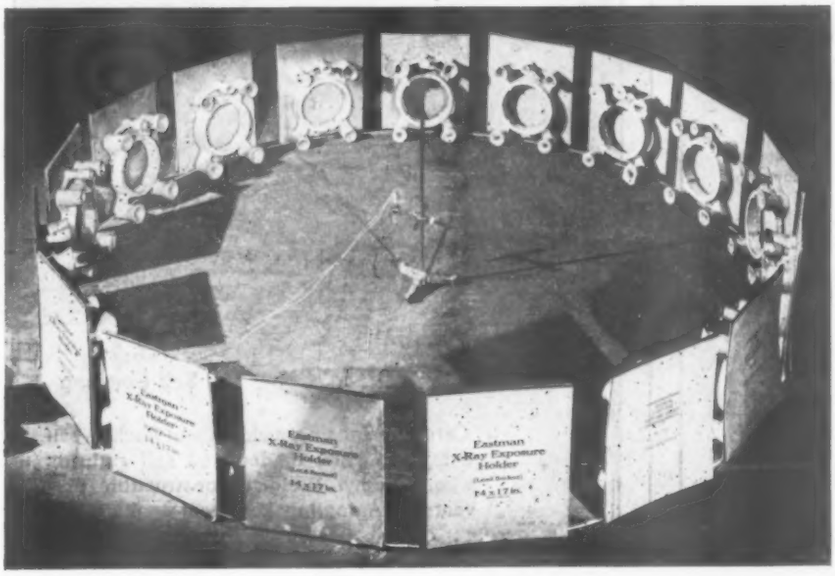
RADIUM RADIOGRAPHY *Performs a* NEW FUNCTION



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"Directional solidification" can easily be studied by the set-up illustrated in the photograph—to indicate the best method of casting with a minimum of defects in the casting itself.

Radium has become a new foundry tool which directly effects an increase in yield. It permits accurate determination of the proper procedure in gating and risering "tough" castings. Seventeen cylindrical castings were radiographed simultaneously by Crane Co. to ascertain the most productive and economical foundry practice.

Radium thus performs a valuable additional function.

For inspection, for determination of directional solidification, Radium is available in capsules of various unit strength in duralumin holders which may be leased or purchased at low rates.

The rental includes full coverage insurance, heavy lead storage containers and slide rule exposure calculators.

Write us concerning any problem of Gamma Ray Radiography

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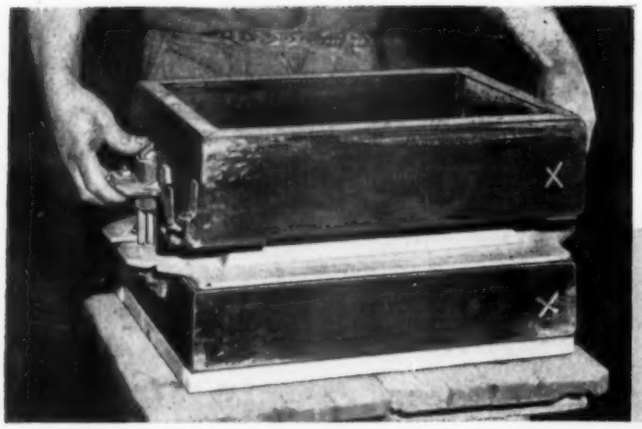
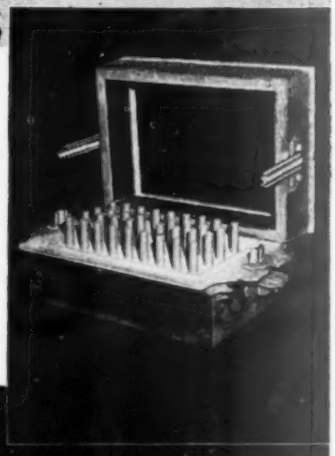


Eliminate Ruined Molds!

GET PERFECT LIFTS WITH BUCKEYE "Three-In-One" Flask Guides

(PATENTED)



Buckeye "Three-In-One" Patented Flask Guides positively prevent the cope from being rocked or shifted while being lifted from the drag!

You get a true perpendicular lift every time because of the *patented* three V-shaped tongues on the pin. The cope, cheek and drag balance perfectly in removing; two finger lugs simplify the raising of the cope from the drag. And the cope returns perfectly straight upon the drag, enabling cores to recede into perfect alignment with the prints!

Pin, slide and match plate lugs are interchangeable, no need to realign if replacement is required.

To retain absolute pattern contour, cut costs and increase production, specify Buckeye "Three-In-One" Patented Flask Guides for all straight or tapered flasks. Furnished in 3, 4, 5, 6, 7 and 8" lengths. Write for full details and prices today!

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Manufacturers of LINSEAL Core Oil — Parting — Core Compounds — Refractory Cements

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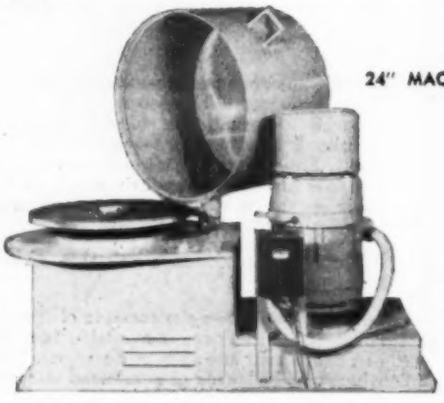
CENTRIFUGAL CASTING MACHINES VERTICAL, HORIZONTAL

Designed and built to meet specific requirements for steel, gray iron, malleable and all nonferrous metals.

The most progressive foundries are already investigating the possibilities of Centrifugal Casting on their product.

For better castings, increase furnace yield, less scrap, reduced machining cost.

We have engineers available to make complete studies to determine investment, production cost, and make recommendations.



24" MACHINE

AIMES ENGINEERING CO., FOUNDRY DEPT.

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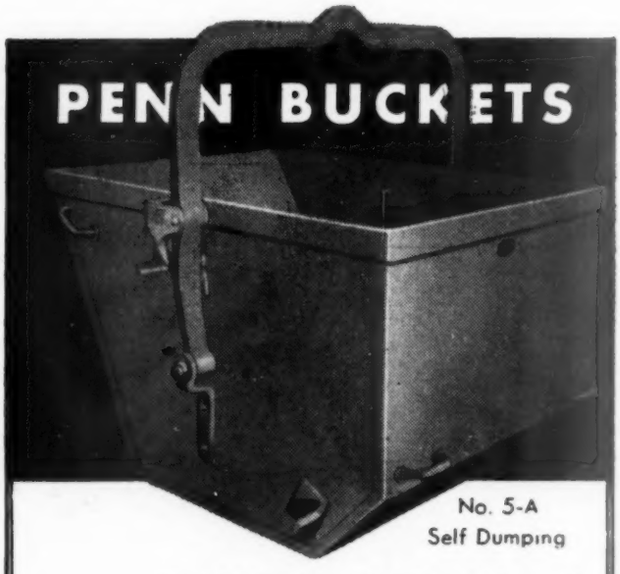
CLEVELAND 14, OHIO

PENN BUCKETS



No. 5-A
Self Dumping

Careful balancing makes Penn Buckets self dumping when loaded and self righting when empty. Welded construction prevents "clinging" makes them empty easily and completely.

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WRITE TODAY FOR NEW BULLETIN DIMENSION SHEET AND PRICE LIST

PENN IRON WORKS

READING, PENNA.

HELPFUL LITERATURE

NOTE TO READERS: If you will check the item or items described which particularly interest you, we will be glad to request the manufacturers concerned to send you their literature. Use the attached postal card

1. Industrial Lift Trucks

Hyster Co.—Two illustrated catalogs describe line of industrial power lift trucks. Bulletin No. 1001 presents brief specifications of various sizes of lift trucks, straddle trucks and mobile crane units. 16-page bulletin No. 1016 gives full details of model 40 pneumatic-tired 4000-pound capacity lift truck.

2. Revolving Conveyor

Foundry Equipment, Inc.—4-page illustrated bulletin on Roto-Cast revolving mold conveyors shows how these units increase production in nonferrous foundries. Conveyors are available in 10, 12 and 14-foot diameters.

3. Foundry Engineering

Giffels & Vallet, Inc., Industrial Engineering Div.—8-page illustrated bulletin "The Engineering of Foundry Facilities" explains services offered to aid in product improvement, cost reduction and better working conditions.

4. Metal Inspector

Allen B. DuMont Laboratories, Inc.—10-page illustrated Cyclograph bulletin No. MTL P9 is report entitled "Practical Uses of the Cyclograph in Inspecting Metal Parts." This electronic tester can be used in several ways to obtain useful information about the physical properties of metal.

5. Nickel Alloys

International Nickel Co.—Revised list A tabulates current publications on nickel alloy steels, nickel cast irons, nickel brass and bronzes and nickel plating. Publications offered cover production, fabrication, properties and uses of nickel alloys for industrial applications.

6. Air Separator

Swartwout Co.—4-page illustrated bulletin S-13 describes Airfuge combination air separator and trap for users of compressed air tools and operations. Use of clean, dry air for protection of pneumatic equipment is discussed.

7. Molding Machines

Moline Iron Works—Illustrated folder describes model No. 11 stationary molding machines especially adapted for use in malleable and grey iron, brass, steel or aluminum foundries where two or more heats are run per day and where floors are comparatively small. Three portable models also are covered.

8. Foundry Conveyors

Palmer-Bee Co.—4-page illustrated bulletin "Palmer-Bee Foundry Conveyors" shows typical installations which are claimed to speed sand handling, mold pouring, casting cooling and core baking.

9. Sea Coal Replacement

Delta Oil Products Co.—4-page bulletin describes advantages of Permi-Bond which is designed for foundry use as sea coal replacement material for green sand facing. It is specially prepared pure hydrocarbon which is completely volatile at elevated temperatures. It eliminates blows, scabbing, buckling, rat-tailing, washing and cutting of green sand mold surfaces.

10. Foundry Data

Carpenter Brothers, Inc.—2-page illustrated publication "Foundry Notes" will be issued at regular intervals to those engaged in the foundry industry. Brief news related to foundry practice is published. Names of those wishing to receive this publication will be placed on mailing list.

11. Convection Furnaces

Hevi Duty Electric Co.—12-page illustrated bulletin No. HD 1245 describes pit type convection furnaces with temperature range of 250 to 1850 degrees F. Complete specifications of pit type furnaces for special applications are covered.

12. Core Ovens

Porbeck Mfg. Co.—4-page illustrated bulletin "Porbeck Drawer Type Ovens" describes gas or oil fired core ovens which have recirculating heaters. Wide range of sizes and drawer arrangements is available.

13. Engineering Service

Engineering Service Inc.—4-page illustrated bulletin explains facilities of this consulting firm in furnishing complete surveys, design and engineered systems on wide range of foundry equipment.

14. Testing Equipment

Steel City Testing Laboratory—20-page illustrated catalog "Testing Instruments" completely covers full line of Brinell, tensile, impact and ductility testing instruments. Operating conditions and specifications are included.

15. Dumping Hoppers

Roura Iron Works—4-page illustrated bulletin "In Dollars and Sense" explains how self-dumping hoppers in capacities of ½ to 2 yards can be used to facilitate the handling of all types of bulk materials.

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16. Conveyor Unit

E. W. Buschman Co.—Illustrated folder No. 3L shows industrial applications of conveyor equipment and construction features. Gravity units operating with wheels and rollers are pictured and discussed. Stands for units are described and shown in use.

17. Vibrating Screens

Screen Equipment Co.—28-page illustrated "Guide to Better Screening" describes features and applications of Seco vibrating screens which are available in over 200 models for fine, coarse, and heavy materials for screening, sizing and de-watering.

18. Ventilating Equipment

Ilg Electric Ventilating Co.—36-page illustrated booklet "An Engineer Looks at Ilg" is pictorial trip through company's plant. Details are given on facilities of company for production of ventilating equipment and components.

19. Respirators

American Optical Co.—Illustrated folder gives practical information on use of respirators in foundries and other industrial areas. Included are suggestions on care of units. Price lists are given.

20. Aluminum & Bronze Alloys

Frontier Bronze Corp.—55-page illustrated "Alloy Data Book" serves as guide to aluminum and bronze alloys and their applications in industry. Actual case histories, technical and metallurgical information are given for easy reference.

21. Molding Machines

Pioneer Mfg. Co.—4-page illustrated bulletin shows application of Rapid molding machines. Five different models are described in detail. Specifications, important features and price list are included.

22. Melting Equipment

Fisher Furnace Co.—4-page illustrated folder contains data on oil burners, crucible furnaces, core ovens, centrifugal blowers, indicating and controlling pyrometers, furnace cement and silicon carbide furnace lining.

23. Core Blower

Wm. Demmler & Bros.—2-page illustrated data sheet on No. 50 core blowing machine gives details on this unit which has capacity of up to 200 cores per hour.

24. Iron Cutting

National Cylinder Gas Co.—16-page illustrated catalog No N606 presents simplified methods, techniques and procedures for oxyacetylene cutting cast iron as encountered in various fields of industry. Diagrams and cutaway views show applications.

25. Boron Carbide

Norton Co.—10-page illustrated booklet covers manufacture, physical characteristics and uses of Norbide boron carbide extremely hard material which is used in production of dies, gages, anvils, pressure blast nozzles and abrasives.

26. Foundry Equipment

American Foundry Equipment Co.—24-page illustrated catalog describes complete line of equipment which includes Airless blast cleaning units, shot peening equipment, metal washing machines, dust collectors, Sandcutter for conditioning foundry sand, rod straightener and shear, and blast nozzles.

27. Metal Cutting

W. O. Barnes Co.—48-page illustrated catalog is complete treatise on metal sawing as applied to foundry and industrial uses. Recommendations on use of hand and power saws together with instructions on operations are given. Tables of tooth speeds, specifications and prices are included.

28. Mold Spray

Hercules Powder Co., Naval Stores Dept.—8-page illustrated folder on Truline Mold Spray 91 explains how this material strengthens, hardens and dries mold surface to provide improved molds for production of steel, iron and nonferrous castings.

29. Steel Furnaces

Ajax Electrothermic Corp.—16-page illustrated catalog No. 11-B describes high speed melting of alloy steels and other ferrous metals. Furnaces in sizes from 120 pounds to several tons capacity are pictured. Helpful hints in planning efficient shop and table showing proper equipment to meet production schedule are included.

30. Band Saw

Kalamazoo Tank & Silo Co., Machine Tool Div.—8-page illustrated bulletin No. 46 presents design and application data on the Kalamazoo metal cutting band saw which features built-in coolant system, automatic feed and capacity for round stock up to 8-inch diameter. Extra capacity model will hold stock up to 24 inches wide.

31. Bearing Alloys

American Smelting & Refining Co., Federated Metals Div.—36-page illustrated "Bearing Alloys Technical Manual" covers history of bearing metals, describes significant developments and reports on effect of composition on bearing alloys. Data are included on melting, bonding and casting of bearings. Causes of bearing failures are listed.

32. Fire Brick

Ironton Fire Brick Co.—52-page illustrated pocket-size catalog contains data on fire brick for use in cupolas, chemical and automotive industries; by-product coke ovens; open hearths; lime kilns; boiler settings; malleable, glass and heating furnaces; annealing ovens; incinerators; water gas machines and ceramic kilns.

33. Crane Equipment

Industrial Equipment Co.—8-page illustrated bulletin "Jib Cranes" includes diagram sketches, capacity and span data and practical industrial usage of more than eleven different models of cranes.

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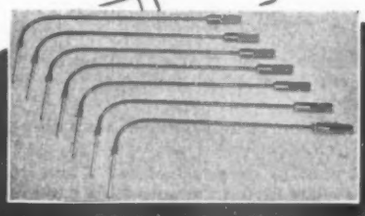
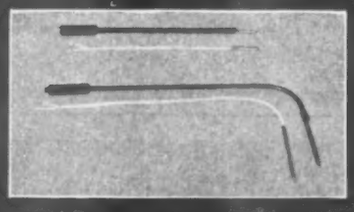


The Furnace type Marshall Thermocouple shown at left comes in 50-inch length, with all metal parts of heat-resistant alloy.



Shown at right are the two types of Marshall Thermocouples with the handy replacement Units used for each size.

No matter what plus or minus variation in temperature can be tolerated, your molten metal temperatures must be carefully checked. Nonferrous foundrymen everywhere have "found that out".

A large eastern foundry company writes: "Since using Marshall Thermocouples to get proper temperature control, we have 75% less misruns, much less shrinkage, less cleaning time due to 'burning in' of bronze in sand molds, and reduced gas porosity in both brass and aluminum castings." (Name on request).

The Marshall Thermocouple is an enclosed-tip instrument that eliminates trouble in taking molten metal temperatures. It is easy to use, and its readings are dependable. L. H. Marshall Co., 270 W. Lane Ave., Columbus 2, Ohio.

MARSHALL
Thermocouples

NOXPATCH

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For lining and patching Brass, Bronze and Aluminum melting furnaces and crucibles there is no better material than NOXPATCH. Used for years by over five hundred non-ferrous melters, NOXPATCH will demonstrate how you can maintain longer furnace lining life. Remember—NOXPATCH DOES NOT "slag", "shrink" or "grow"!

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Ferrous and non-ferrous melters alike, have found that LADELITE Has fulfilled the claim, "Use LADELITE and Pour From Clean Ladles". For eliminating bridging, for cutting down that frequent job of lining and patching ladles and spouts use LADELITE.

Write us today for further information and the name of your NOXPATCH and LADELITE distributor.

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PC* = *Positive Control of the Gyrating Action*

SECO'S PC* ENABLES FOUNDRIES TO RECLAIM MAXIMUM OF USABLE SAND

In operation, Seco's patented construction puts every inch of screen to work. Thus, no matter how the load is distributed, the sand is quickly and thoroughly screened and dirt and foreign matter is removed. The smooth operation of a Seco keeps the load moving, reduces blinding and plugging and Seco's patented auxiliary vibrator enables efficient screening even when sand is damp and sticky.

Designed and engineered by screening experts, dependable Seco vibrating screens are delivering trouble free, money saving performances in many leading foundries. Send for free catalog today. Dept. G.

SECO SCREEN EQUIPMENT CO., INC.
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OHIO LIFTING MAGNETS
SAVE TIME AND MONEY FOR FOUNDRIES

An Ohio Magnet can cut the cost of unloading pig and scrap 80% over hand labor methods, very important in these days of high wages.

A few continuously operating foundries even charge the cupola with a magnet.

How many tons per day do you handle? Have you a crane and if so, what lifting capacity? What kind of electric current do you use?

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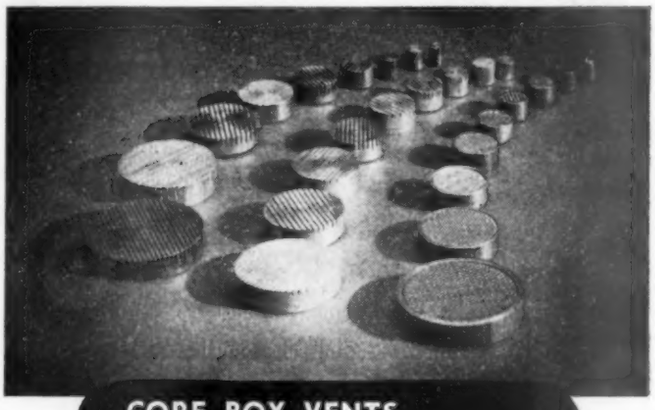

CORE BOX VENTS TO FIT EVERY NEED

Here's part of a complete line of DEMMLER core box vents—rigidly constructed in varying sizes of slotted brass—slotted steel—and screen mesh. Orders filled promptly from stock!

BRASS SLOTTED CORE BOX VENTS
Slot widths: .010", .013" .015"
Diameters: 1/8", 3/16", 1/4", 5/16", 3/8", 7/16", 1/2", 5/8", 3/4", 7/8", 1", 1 1/4", 1 1/2"

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Slot widths: .010", .013" .015"
Diameters: 1/8", 3/16", 1/4", 5/16", 3/8", 7/16", 1/2", 5/8", 3/4", 7/8", 1", 1 1/4", 1 1/2"

SCREEN TYPE CORE BOX VENTS
Mesh: #30, #40, #50.
Diameters: 1/8", 3/16", 1/4", 5/16", 3/8", 7/16", 1/2", 5/8", 3/4", 7/8", 1", 1 1/4", 1 1/2"

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Wm. DEMMLER & Bros
Kewanee, Illinois
MANUFACTURERS OF CORE BLOWERS EXCLUSIVELY SINCE 1911

FOR TOP PRODUCTION
OF CASTINGS AND INGOTS

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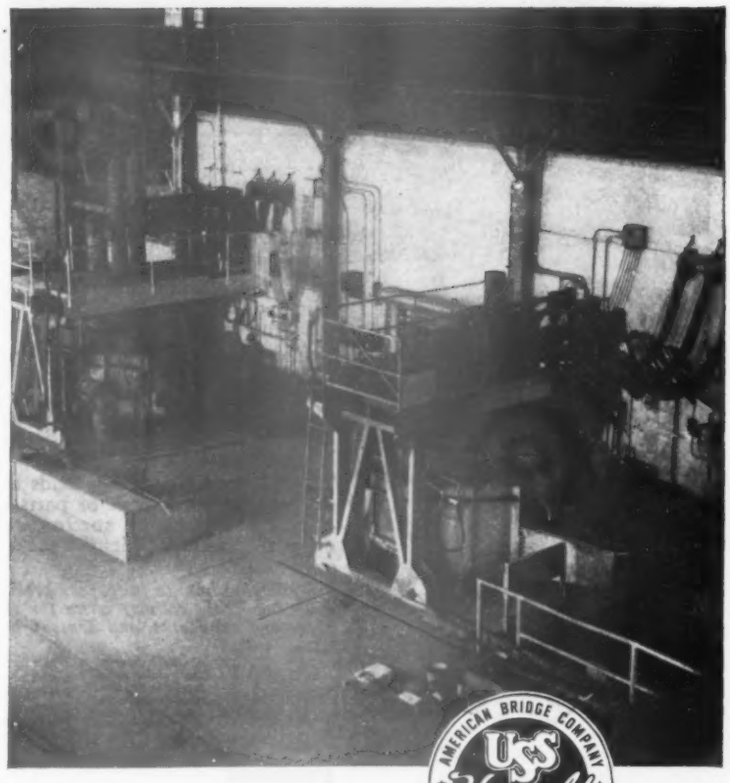
Top charging

Effective gantry design combined with platform attached to furnace for minimum maintenance and maximum efficiency of operation.



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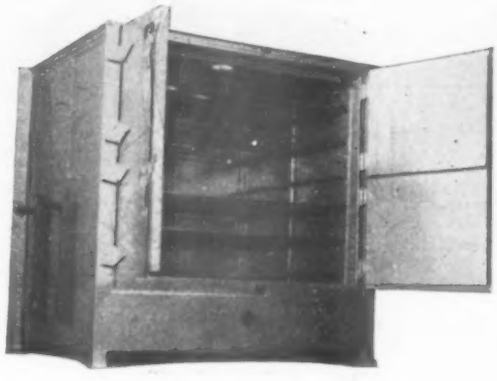

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THE NEW "KLEEN KAST" AUTOMATIC CONTROLLED INSULATED CORE OVEN WITH 50" DEPTH 50" HIGH

60" WIDTH FOUR-DOORS, FOUR REMOVABLE RACKS & TWO BURNERS
CALL OR WRITE US FOR FULL DETAILS

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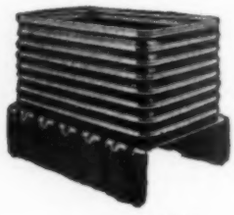
THE HOFFMAN FOUNDRY SUPPLY CO.

1193 MAIN AVE. CLEVELAND, OHIO

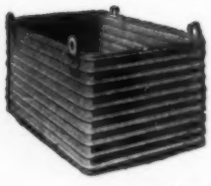
BEE-LINE PRODUCTION

with Truscon Steel Foundry Flasks and Boxes

They promote greater Plant Efficiency



PB-120



B-80C

To keep production lines busy as a swarm of bees—to eliminate wasted effort—to get bee-line production—use Truscon Steel products for foundries.

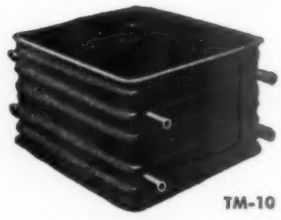
Truscon Foundry Flasks will keep your production lines running smooth as honey—help pack more production into every hour. That's because they offer five big advantages: Light Weight, Strength Where Needed, Durability, Proper Shapes and Sizes, Easily Rammed and Shaken Out.

Truscon Steel Boxes and Skids assure more efficient storage and movement of parts and material. They eliminate last-minute sorting and gathering. And make sure material hits the production line on time, every time.

For ideas on how to keep your production lines humming with profitable activity write for illustrated catalogs on Truscon Steel Flasks, and Truscon Steel Boxes and Skids.

Write for descriptive catalog showing many different models of sturdy, durable Truscon Steel Boxes and Skids.

Write for descriptive catalog showing wide range of Truscon Foundry Flasks for every need.



TM-10

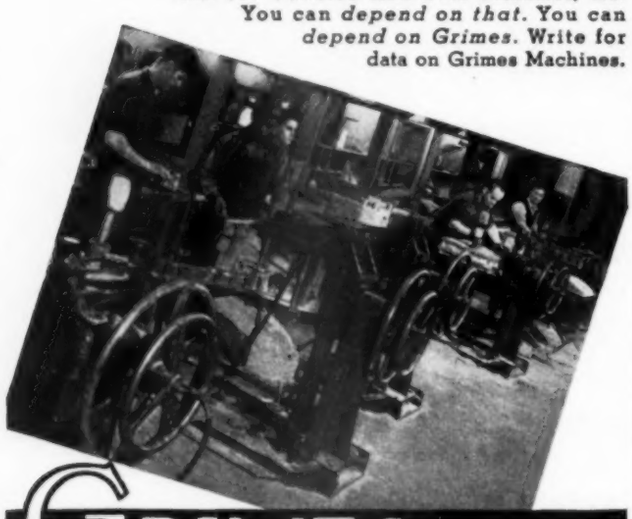
TMR-60

TRUSCON STEEL COMPANY, Pressed Steel Division • 6100 Truscon Ave., Cleveland 4, Ohio • Subsidiary of Republic Steel Corporation

FOR BETTER MOLDS

DEPEND ON GRIMES

● Many thousands of better molds are made annually on this battery of Grimes Hand Rammed Roll-Over Machines. The same sturdiness, the same ability to stand up under tough day-after-day pounding is built into Grimes Hand Rammed Power Roll-Over Machines and Jolt Powered Roll-Over Machines, too. You can *depend on that.* You can *depend on Grimes.* Write for data on Grimes Machines.



GRIMES MOLDING MACHINE CO.

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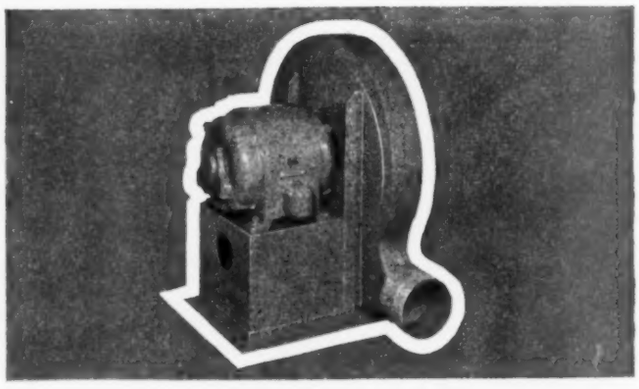

"GENERAL" CENTRIFUGAL BLOWERS

Single- and Multi-Stage
Pressures—4 to 32 oz.

FOR GAS AND OIL BURNING

in Non-Ferrous Melting,
Annealing Furnaces, Core Ovens, Etc.

CUPOLA BLOWERS—GAS BOOSTERS

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with Specifications, Capacities, Dimensions.

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Faster, lower-cost movement of everything around your foundry... with this powerful, mobile

ROUSTABOUT CRANE

Equipped with hook, magnet or bucket

You can cut your expense of moving large or small castings between foundry and yard—or anywhere, indoors or out—with this popular versatile Roustabout. Easily shifted from hook to magnet to grab-bucket, you get fast low cost action all over your plant. Modernly built for loads to 7½ tons and years of overwork, ball-bearing boom turntable, all gears in oil. It pays you to write today for the full story of this manpower and cost saver.

• With magnet, Roustabout handles ingots, scrap, large or small castings.

• With grab-bucket, Roustabout handles molding sand and other loose stuff.

THE HUGHES-KEENAN CO.
651 Newman St., Mansfield, Ohio

ROUSTABOUT CRANE

Roustabout Cranes
By Hughes-Keenan
Load-Handling Specialists Since 1904

You can paste this in your hat:

NON-FERROUS CASTINGS MADE WITH THE USE OF SOFFEL'S NON-FERROUS FLUXES WILL HAVE:

1 — Denser grain structure
2 — Less shrinkage
3 — More fluidity
4 — Greater tensile strength
5 — A saving of tin and zinc

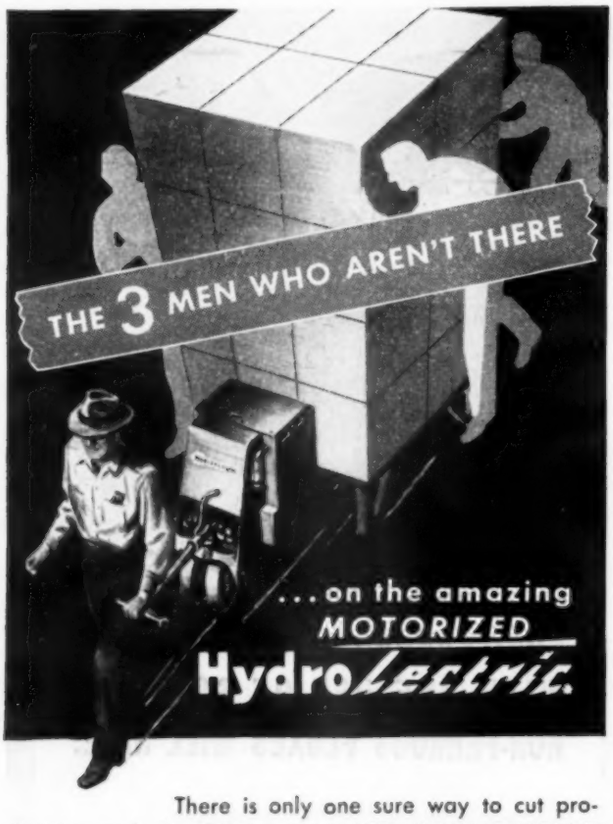
SOFFEL'S purifiers or fluxes remove gases and oxides from the metal through chemical reaction. We have developed and perfected a particular flux for every particular alloy and melting method. None of these fluxes will change the chemical analysis of the metal because they are free from sulphur, phosphor, silicon, aluminum and magnesium. Advise the kind of metal to be treated, and a sample flux will be sent for free trial (in continental United States and Canada only). Ask your dealer, or contact us. Beware of imitations. The success of *CARBON FREE LIQUIDIZER*, which we originated, has inspired many imitators.

SOFFEL'S NON-FERROUS FLUXES

PURIFIERS AND FLUXES FOR ALL METALS AND ALLOYS

PITTSBURGH METALS PURIFYING CORP.

1352 MARVISTA ST., PITTSBURGH, PA.



There is only one sure way to cut production and distribution costs—USE MORE EFFICIENT EQUIPMENT. With the motorized Hydro*LECTRIC*, ONE MAN easily does the work of four—and saves enough to pay for the Hydro*LECTRIC* several times in one year.

And you save still more because the Hydro*LECTRIC* cuts downtime to record lows—noted fleet users say it's so rugged and well-built, the Hydro*LECTRIC* handles more than its 4000 lb. rated capacity up to 24 hours daily—WITH LITTLE OR NO DOWNTIME!

Write for detailed folder "F," showing how the Hydro*LECTRIC* has cut costs in plants of every size and type. We're sure you'll find the Hydro*LECTRIC* can improve your materials moving and do it at far less cost.

Only The Hydro*LECTRIC* Offers So Much

- Positive Gear Drive To Load Wheel
- 4 Wheels for Stability
- Costs only 1/3 and weighs only 1/3 of other powered TRUCKS of equal capacity.
- Records up to 21 years of 8 hour day performance
- Engineered by the Stuebings, Pioneers in Lift Truck Construction since 1910. Patented.

THE RED ARROW

● THE HYDROMATIC

Easy single or multi-stroke hand lift trucks. Capacities up to 8000 lbs. Users state they pay for themselves 5 to 10 times yearly.

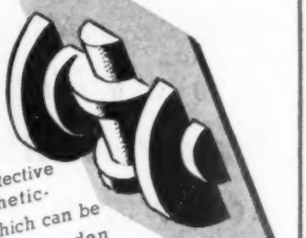
LIFT TRUCKS, INC.

Walter Stuebing, *President*

2425 Spring Grove Ave. Cincinnati 14, Ohio

VULCABOND

FOR CLEANER CASTINGS AND LONG PATTERN LIFE



VULCABOND protective coating is a synthetic-rubber-base liquid which can be painted or sprayed on wooden patterns. It penetrates the cells of wood, seals them against moisture. VULCABOND dries quickly, leaving a smooth, dense surface that helps to keep sand from adhering to the pattern when it is drawn from the sand. Patterns coated with VULCABOND are not affected by heat, acid, alkalis, steam, oil, gasoline or alcohol. VULCABOND resists wear

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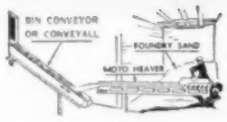
All Purpose CONVEYALL

THE SELF-POWERED LOADER!

THEY HANDLE ANYTHING FROM 300 MESH MATERIAL TO LUMP SIZE COAL



LOAD YOUR FOUNDRY SAND WITH EASE!

The new CONVEYALL standard model shown above can load sand into bins at variable heights up to 10 feet and possesses a scoop arrangement that requires no "shovel-feeding". It is a new innovation in the field of bin loading and possesses many unusual features. Special sizes and lengths can also be constructed. Write for prices and capacity runges.

Cleveland FORMGRADER CO.

A "BECO" PRODUCT

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CLEANER CASTINGS

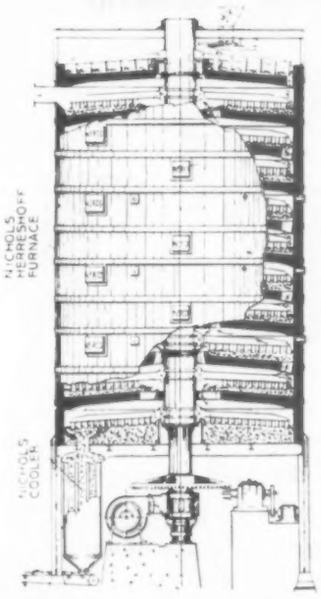
will result from your regular use of

BLOOMSBURY QUALITY FOUNDRY FACINGS

Write today for liberal testing samples.

BLOOMSBURY GRAPHITE CO. since 1882 at BLOOMSBURY, N. J.

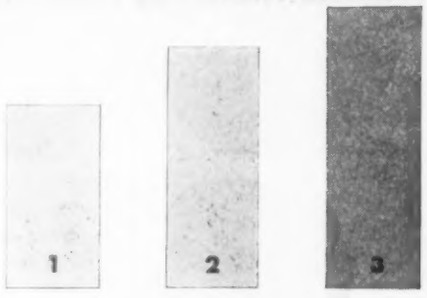
Proved Again "BETTER THAN NEW" SAND AT LOWER COST



The Nichols System reclaims spent foundry sand effectively and economically, with a resulting product of improved characteristics as compared to new sand.

Low in first cost and upkeep, requiring little floor space and simple to operate, the Nichols System can be operated to show recoveries of 95 to 98 per cent.

There is a Nichols Sand Reclaiming System for your individual needs, either for thermal processing exclusively, or in combination with scrubbing and classifying.



Comparison of Reclamation Methods:

1. Wet Scrubbing Method
2. Thermal Method—Preliminary Wet Treatment (Iron Foundry)
3. Thermal Method—Preliminary Wet Treatment (Steel Foundry)

Write for information or discuss your problems with a Nichols engineer.

NERCO

NICHOLS ENGINEERING & RESEARCH CORPORATION

60 WALL TOWER, NEW YORK 5, N. Y. UNIVERSITY TOWER BLDG., MONTREAL, P. Q.

THE GREEKS HAD A WORD FOR IT—

ITS ENGLISH EQUIVALENT

IS **SATISFACTION!**

Of utmost significance to you as a belt user is the fact that many Imperial customers have stuck by our belting continuously for nearly four decades.

Send for their names and the performance records; compare; then just follow your own good judgment. No obligation, of course.

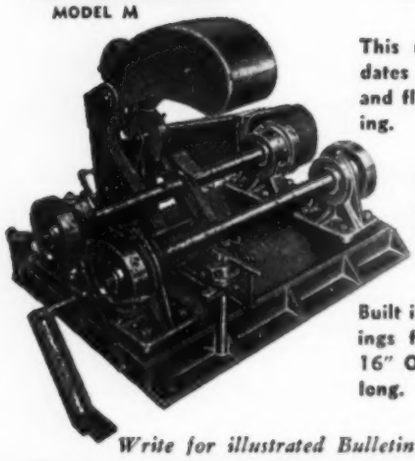
"BELTING SPECIALISTS SINCE 1910"

IMPERIAL BELTING CO., 1750 S. KILBOURN AVE., CHICAGO 23, ILL.

HORIZONTAL CENTRIFUGAL CASTING MACHINE

TO PRODUCE FERROUS and NON-FERROUS CASTINGS

MODEL M



This machine accommodates both metal molds and flasks for sand molding.

Continuously variable speed control using standard AC power.

Built in six sizes for castings from 1½" O.D. to 16" O.D. and up to 48" long.

Write for illustrated Bulletin No. 443

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THE paddle-type mixer for core sand mixing in the foundry. Blystone Mixers offer: low mix cost, thorough mixing, and easy operation. There is a sturdily built type and size for your problem. Send for Bulletin and full details.

• BLYSTONE DIVISION •
STANDARD SAND & MACHINE CO.
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"Alloy 99" SHOT

IT'S BACK AGAIN

With 5 good reasons for its popularity

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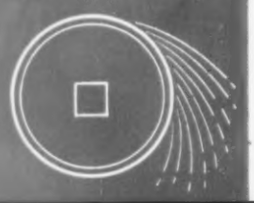

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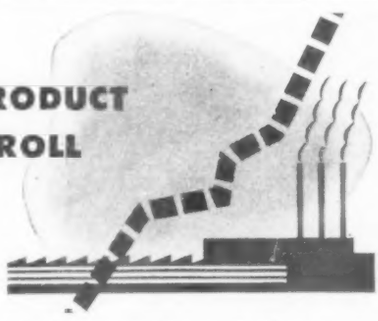

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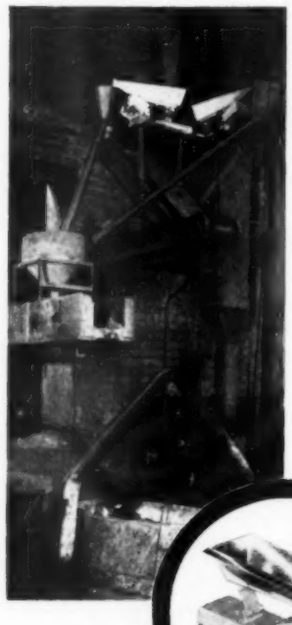

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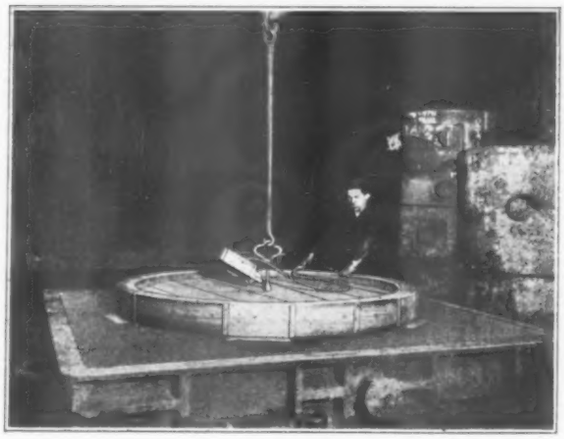

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Made in Patented Coil Head, Square Head, Stem and Double-Head types.

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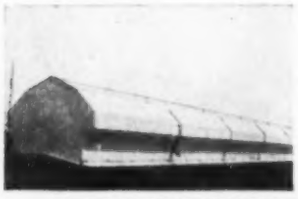

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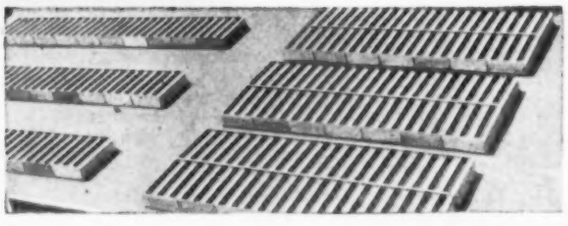

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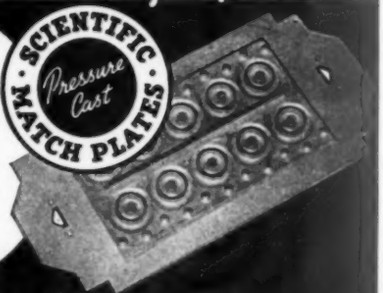

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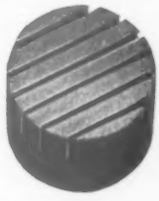
CORE  BOX

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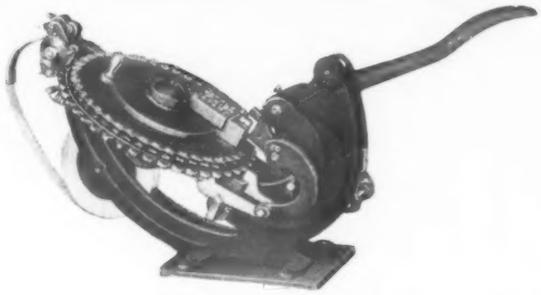

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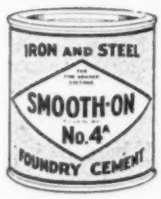

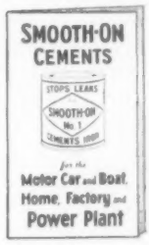

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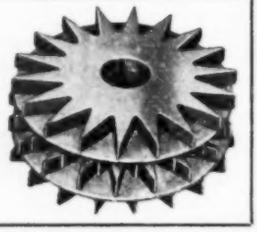

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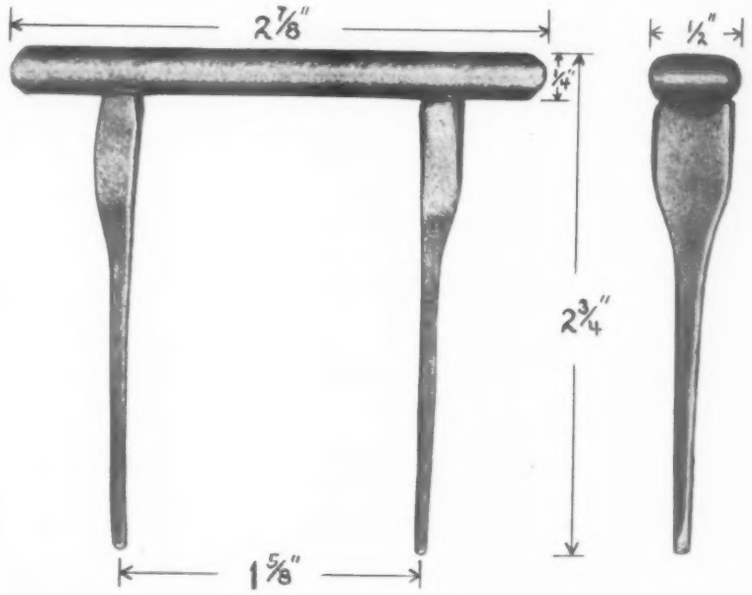

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Jeffrey Mfg. Co., 907 N. Fourth St., Columbus 16, O.
Link Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.
Mathews Conveyer Co., Ellwood City, Pa.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.

CONVEYORS (Pneumatic)

Fuller Company, Catasauqua, Pa.

CONVEYORS (Portable)

Link Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.

CONVEYORS (Portable-Gas Electric)

Cleveland Formgrader Co., 6723 Denison Ave., Cleveland, O.
Coaltoter Conveyor Co., 310 So. Michigan, Chicago 4, Ill.
Link Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.

CONVEYORS (Rubber)

Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland 14, O.
Standard Conveyor Co., North St. Paul 9, Minn.

CONVEYORS (Vibrating)

Ajax Flexible Coupling Co., Westfield, N. Y.

CONVEYORS (Vibrating) (cont'd)

Jeffrey Mfg. Co., 907 N. Fourth St., Columbus 16, O.
Link Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.
Syntron Company, Homer City, Pa.

COPPER

American Smelting & Refining Co., 120 Broadway, New York 5, N. Y.

COPPER SHOT

American Smelting & Refining Co., 120 Broadway, New York 5, N. Y.
Silverstein & Pinsof, Inc., 1720 N. Elston, Chicago 22, Ill.
Western Metal Co., 3201 S. Kedzie Ave., Chicago 26, Ill.

CORE BINDERS

American Gum Products Co., 500 Fifth Ave., New York 18, N. Y.
Certified Core Oil & Mfg. Co., 3308 So. Chicago Ave., Chicago 50, Ill.
Cities Service Oil Co., 3200 S. Western Ave., Chicago 8, Ill.
Corn Products Sales Co., 17 Battery Pl., New York 4, N. Y.
Delta Oil Products Co., Milwaukee 9, Wis.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
Hercules Powder Co., 999 Market St., Wilmington 99, Del.
Houghton Co., E. F., 303 West Lehigh Ave., Philadelphia 33, Pa.
International Paper Co., 220 E. 42nd St., New York 17, N. Y.
Chas. A. Krause Milling Co., S. 43rd & Burnham St., Milwaukee, Wis.
Pennsylvania Foundry Supply & Sand Co., Ashland & E. Lewis Sts., Philadelphia 24, Pa.
Robeson Process Co., 500 Fifth Ave., New York 18, N. Y.
Werner G. Smith Co., 2191 W. 110th St., Cleveland 2, O.
Frederic B. Stevens, Inc., Detroit 26, Mich.
United Oil Mfg. Co., 1429 Walnut St., Erie, Pa.
Velsicol Corp., 120 E. Pearson St., Chicago 11, Ill.

CORE BLOWING MACHINES

Champion Foundry & Machine Co., 1314 W. 21st St., Chicago 8, Ill.
Wm. Demmler & Bros., Kewanee, Ill.
International Molding Machine Co., 2608 W. 16th St., Chicago 8, Ill.
Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland 14, O.
Bedford Iron & Equipment Co., 21315 W. McNichols Rd., Detroit, Mich.,

CORE COMPOUND

Certified Core Oil & Mfg. Co., 3308 So. Cicero Ave., Chicago 50, Ill.
Cities Service Oil Co., 3200 S. Western Ave., Chicago 8, Ill.
Delta Oil Products Co., Milwaukee 9, Wis.
The Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
Houghton Co., E. F., 303 West Lehigh Ave., Philadelphia 33, Pa.
International Paper Co., 220 E. 42nd St., New York 17, N. Y.
The Werner G. Smith Co., 2191 W. 110th St., Cleveland 2, O.
Pennsylvania Foundry Supply & Sand Co., Ashland & E. Lewis Sts., Philadelphia 24, Pa.
Smith Facing & Supply Co., 1857 Carter Rd., Cleveland 13, O.
Frederic B. Stevens, Inc., Detroit 26, Mich.
Velsicol Corp., 120 E. Pearson St., Chicago 11, Ill.

CORE BREAKERS

Cleveland Pneumatic Tool Co., 3781 E. 77th St., Cleveland 5, O.

CORE DRAWER

Freeman Supply Co., Toledo 5, O.

CORE GRINDERS (Power Operated)

Jeffrey Mfg. Co., 907 N. Fourth St., Columbus 16, O.
Milwaukee Foundry Equipment Co., 3238 W. Pierce St., Milwaukee 4, Wis.

CORE KNOCKOUT MACHINES

Beardsley & Piper Co., The 2541 N. Keeler Ave., Chicago 39, Ill.
Pangborn Corp., Hagerstown, Md.
Simplicity Engineering Co., Durand, Mich.

CORE MAKING MACHINES

Champion Foundry & Machine Co., 1314 W. 21st St., Chicago 8, Ill.
Davenport Machine & Foundry Co., Davenport, Iowa.
Wm. Demmler & Bros., Kewanee, Ill.
Herman Pneumatic Machine Co., Union Bank Bldg., Pittsburgh 22, Pa.
International Molding Machine Co., 2608 W. 16th St., Chicago 8, Ill.
Malwaukee Foundry Equipment Co., 3228 W. Pierce St., Milwaukee 4, Wis.
Redford Iron & Equipment Co., 21315 W. McNichols Rd., Detroit, Mich.

CORE OIL

Buckeye Products Co., 7022 Vine St., Cincinnati 16, O.
Certified Core Oil & Mfg. Co., 3308 So. Cicero Ave., Chicago 50, Ill.
Cities Service Oil Co., 3200 S. Western Ave., Chicago 8, Ill.
Delta Oil Products Co., Milwaukee 9, Wis.
Gamlen Chemical Co., 1469 Spring Garden Ave., Pittsburgh 12, Pa.
Hoffman Foundry Supply Co., 1193 Main St., Cleveland, O.
Houghton Co., E. F., Philadelphia, Pa.
Pennsylvania Foundry Supply & Sand Co., Ashland & E. Lewis Sts., Philadelphia 24, Pa.
Werner G. Smith Co., 2191 W. 110th St., Cleveland 2, O.
Frederic B. Stevens, Inc., Detroit 26, Mich.
United Oil Mfg. Co., 1429 Walnut St., Erie, Pa.
Velsicol Corp., 120 E. Pearson St., Chicago 11, Ill.

CORE OVENS

Carl-Mayer Corp., 3030 Euclid Ave., Cleveland 15, O.
Bartlett & Snow Co., C. O., 6201 Harvard Ave., Cleveland 5, O.
Despatch Oven Co., Minneapolis 14, Minn.
Detroit Sheet Metal Works, 1300 Oakman Blvd., Detroit, Mich.
Foundry Equipment Co., Cleveland 13, O.
Gehnrich Oven Div., W. S. Rockwell Co., 56 Church St., New York 7, N. Y.
Haynes Foundry Equipment Co., 1734 Lake St., Kalamazoo 21, Mich.
Kirk & Blum Mfg. Co., 2838 Spring Grove Ave., Cincinnati 25, O.
Lanly Company, 750 Prospect Ave., Cleveland 15, O.
Machler, Paul, Co., 2200 W. Lake St., Chicago 12, Ill.
Mahon, R. C., Co., 8650 Mt. Elliott Ave., Detroit 11, Mich.
Pennsylvania Foundry Supply & Sand Co., Ashland & E. Lewis Sts., Philadelphia 24, Pa.
Porbeck Mfg. Co., 2600 N. 9th St., St. Louis, Mo.
Ross, J. O., Engineering Corp., 350 Madison Ave., New York 17, N. Y.
Young Brothers Co., 6508 Mack Ave., Detroit 7, Mich.

CORE PASTE

Corn Products Sales Co., 17 Battery Pl., New York 4, N. Y.
Dayton Oil Co., Dayton, O.
Delta Oil Products Co., Milwaukee 9, Wis.
Eastern Clay Products Co., Eifort, O.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.

CORE PLATES (Steel, Asbestos)

Diamond Clamp & Flask Co., Richmond, Ind.
Johns-Manville, 22 E. 40th St., New York 16, N. Y.

CORE PLATES (Steel, Asbestos) (cont'd)

Sterling Wheelbarrow Co., 7100 W. Walker St., Milwaukee 14, Wis.
Truscon Steel Co., Youngstown 1, O.

CORE RODS

Bethlehem Steel Co., Bethlehem, Pa.

CORE RODS (Carbon, Graphite)

National Carbon Co. Inc., Carbon Products Div., 30 E. 42nd St., New York 17, N. Y.

CORE ROD STRAIGHTENING and CUTTING MACHINERY

American Foundry Equipment Co., 505 S. Byrkit St., Mishawaka, Ind.
Kane & Roach, Syracuse, N. Y.

CORE SAND

Standard Silica Corp., 209 So. LaSalle St., Chicago 4, Ill.

CORE SAND MIXERS

American Foundry Equipment Co., 505 S. Byrkit St., Mishawaka, Ind.
Baker Perkins Inc., Saginaw, Mich.
Beardsley & Piper Co., The, 2541 N. Keeler Ave., Chicago 30, Ill.
Blystone Division, Standard Sand & Machine Co., 549 W. Washington St., Chicago 6, Ill.
Clearfield Machine Co., Clearfield, Pa.
Construction Machinery Corp., Waterloo, Iowa.
Freeman Supply Co. 1152 E. Broadway, Toledo 5, O.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.
Rover Foundry & Machine Co., Kingston, Pa.

CORE SPRAYERS

Freeman Supply Co., 1152 Broadway, Toledo 5, O.

CORE TRAYS

Chicago Mfg. & Distributing Co., 1928 W. 46th St., Chicago 9, Ill.

CORE TRUCKS

Chicago Mfg. & Distributing Co., 1928 W. 46th St., Chicago 9, Ill.
Clark Tructractor Div. of Clark Equipment Co., Battle Creek, Mich.
Kirk & Blum Mfg. Co., 2838 Spring Greve Ave., Cincinnati 25, O.

CORE VENTS

Demmler, Wm., & Bros., Kewanee, Ill.
PMS Co., 1701 Power Ave., Cleveland 14, O.
Rienacker Industries, 2035 Hilton Rd., Ferndale, Mich.
Sinel Co., 1405 Philadelphia Drive, Dayton 6, O.
Smillie, C. M., & Co., 1100 Woodward Hgts. Blvd., Ferndale, Mich.
United Compound Co., Inc., 328 South Park Ave., Buffalo 4, N. Y.

CORE WASH

Asbury Graphite Mills, Asbury, N. J.
Bloomsbury Graphite Co., Bloomsbury, N. J.
Carborundum Co., Perth Amboy, N. J.
Cities Service Oil Co., 3200 S. Western Ave., Chicago 8, Ill.
Corn Products Sales Co., 17 Battery Pl., New York City 4.
Delta Oil Products Co., Milwaukee 9, Wis.
Federal Foundry Supply Co., 4600 E. 71 St., Cleveland 5, O.
Houghton Co., E. F., 303 West Lehigh Ave., Philadelphia 33, Pa.
National Carbon Co. Inc., Carbon Products Div., 30 E. 42nd St., New York 17, N. Y.
Pennsylvania Foundry Supply & Sand Co., Ashland & E. Lewis Sts., Philadelphia 24, Pa.
Smith Facing & Supply Co., 1857 Carter Rd., Cleveland 13, O.
Stevens, Frederic B., Inc., Detroit 26, Mich.
United Oil Mfg. Co., 1429 Walnut St., Erie, Pa.
United States Graphite Co., Saginaw, Mich.

CORE WIRE CUTTERS

Federal Foundry Supply Co., 4600 E. 71st., Cleveland 5, O.

CORE WIRE STRAIGHTENERS
American Foundry Equipment Co., 505 S. Byrkit St., Mishawaka, Ind.
Federal Foundry Supply Co., 4600 E. 71st., Cleveland 5, O.

CORES (Annealing)
Pressed Steel Co., Wilkes-Barre, Pa.

CORES (Ceramic)
American Lava Corp., Chattanooga, Tenn.

COUPLINGS (Flexible)
Ajax Flexible Coupling Co., Westfield, N. Y.

CRANES (Bucket)
Whiting Corp., 15607 Lathrop Ave., Harvey, Ill.

CRANE CONTROL (Electric)
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

CRANE LUBRICATING SYSTEMS
Blaw-Knox Co., Farmers Bank Bldg., Pittsburgh, Pa.

CRANES (Electric Traveling)
American MonoRail Co., 13104 Athens Ave., Cleveland 7, O.
Cleveland Tramrail Div., of Cleveland Crane & Engineering Co., 1155 East 283rd St., Wickliffe, O.
Erie Steel Construction Co., Erie, Pa.
Forker Corp. Div. of Ohio Tramrail, 1826 East 47th St., Cleveland, Ohio.
Northern Engineering Works, 2615 Atwater, Detroit, Mich.
Reading Chain & Block Corp., 2108 Adams St., Reading, Pa.
Shepard-Niles Crane & Hoist Corp., 360 Schuyler Ave., Montour Falls, N. Y.
Whiting Corp., 15607 Lathrop Ave., Harvey, Ill.
Wright Mfg. Div., American Chain & Cable Co., York, Pa.

CRANES (Gantry)
Cleveland Tramrail Div. of Cleveland Crane & Engineering Co., Wickliffe, Ohio.
Forker Corp. Div. of Ohio Tramrail, 1826 East 47th St., Cleveland, Ohio.
Modern Equipment Co., Port Washington, Wis.
Northern Engineering Works, 2615 Atwater, Detroit, Mich.
Wellman Engineering Co., 7000 Central Ave., Cleveland 4, O.
Whiting Corp., 15607 Lathrop Ave., Harvey, Ill.

CRANES (Hand Traveling)
American Monorail Co., 13104 Athens Ave., Cleveland 7, O.
Cleveland Tramrail Div. of Cleveland Crane & Engineering Co., 1155 East 283rd St., Wickliffe, O.

CRANES (Hand Traveling)
Forker Corp. Div. of Ohio Tramrail, 1826 East 47th St., Cleveland, Ohio
Modern Equipment Co., Port Washington, Wis.
Northern Engineering Works, 2615 Atwater, Detroit, Mich.
Reading Chain & Block Corp., 2108 Adams St., Reading, Pa.
Shepard-Niles Crane & Hoist Corp., 3960 Schuyler Ave., Montour Falls, N. Y.
Whiting Corp., 15607 Lathrop Ave., Harvey, Ill.

CRANES (Jib)
American Monorail Co., 13104 Athens Ave., Cleveland 7, O.
Cleveland Tramrail Div. of Cleveland Crane & Engineering Co., Wickliffe, Ohio
Forker Corp. Div. of Ohio Tramrail, 1826 East 47th St., Cleveland, Ohio
Modern Equipment Co., Port Washington, Wis.
Whiting Corp., 15607 Lathrop Ave., Harvey, Ill.

CRANES (Monorail)
American Monorail Co., 13104 Athens Ave., Cleveland 7, O.
Cleveland Tramrail Div. of Cleveland Crane & Engineering Co., 1155 East 283rd St., Wickliffe, O.

CRANES (Monorail) (cont'd)
Forker Corp. Div. of Ohio Tramrail, 1826 East 47th St., Cleveland, Ohio
Modern Equipment Co., Port Washington, Wis.
Northern Engineering Works, 2615 Atwater, Detroit, Mich.
Shepard-Niles Crane & Hoist Corp., 360 Schuyler Ave., Montour Falls, N. Y.

CRANES (Self-Propelled)
Hughes-Keenan Co., Mansfield, Ohio

CRUCIBLES
American Crucible Co., Shelton, Conn.
Electro Refractories & Alloys Corp. Vars Bldg., Buffalo 2, N. Y.
Dixon, Joseph, Crucible Co., Jersey City, N. J.
Lava Crucible Co., Pittsburgh, Pa.
National Carbon Co., Inc., Carbon Products Div., 30 E. 42nd St., New York 17, N. Y.
Ross-Tacony Crucible Co., Tacony, Philadelphia, Pa.
Vesuvius Crucible Co., Swissvale, Pa.

CRUCIBLE FURNACES
Ajax Electrothermic Corp., Trenton, N. J.
Campbell-Hausfeld Co., Harrison, O.
Fisher Furnace Co., 5523 N. Wolcott Ave., Chicago 40, Ill.
W. S. Rockwell Co., 56 Church St., New York 7, N. Y.

CRUCIBLE LIFTERS
Modern Equipment Co., Port Washington, Wis.

CRUCIBLE POURING DEVICES
Modern Equipment Co., Port Washington, Wis.

CUPOLAS
Modern Equipment Co., Port Washington, Wis.
Tabor Mfg. Co., 6225 Tacony St., Philadelphia 35, Pa.
Whiting Corp., 15607 Lathrop Ave., Harvey, Ill.

CUPOLA BLOWERS
Roots-Connersville Blower Corp., Connersville, Ind.
Sturtevant Co., B. F., Div. of Westinghouse Electric Co., Hyde Park, Boston, Mass.
Whiting Corp., 15607 Lathrop Ave., Harvey, Ill.

CUPOLA CHARGING MACHINES
American Monorail Co., 13104 Athens Ave., Cleveland 7, O.
Cleveland Tramrail Div. of Cleveland Crane & Engineering Co., Wickliffe, Ohio.
Modern Equipment Co., Port Washington, Wis.
Shepard-Niles Crane & Hoist Corp., 360 Schuyler Ave., Montour Falls, N. Y.
Whiting Corp., 15607 Lathrop Ave., Harvey, Ill.

CUPOLA CONTROL EQUIPMENT
Carman, Edwin S., Lee Rd., at Mayfield, Cleveland 18, O.
Foxboro Company, Foxboro, Mass.

CUPOLA DUST ARRESTORS
Schneible Co., Claude B., 2827—25th St., Detroit 16, Mich.
Whiting Corp., 15607 Lathrop Ave., Harvey, Ill.

CUPOLA LIGHTERS
Hauck Mfg. Co., 106 Tenth St., Brooklyn 15, N. Y.

CUPOLA LININGS
Carborundum Co., Perth Amboy, N. J.
Cleveland Quarries Co., Guildhall Bldg., Cleveland 15, O.
Ironton Fire Brick Co., Ironton, O.
Nock and Sons Co., 1243 East 55th St., Cleveland 14, Ohio
United States Graphite Co., Saginaw, Mich.

CUPOLA SPARK ARRESTORS
Whiting Corp., 15607 Lathrop Ave., Chicago, Ill.

CUTOFF MACHINES (Abrasive)
Clipper Mfg. Co., 4030 Manchester, St. Louis, Mo.
Fox Grinders Inc., Oliver Bldg., Pittsburgh, Pa.
Tabor Mfg. Co., 6225 Tacony St., Philadelphia 35, Pa.

CUTTING OILS
Houghton Co., E. F., 303 West Lehigh Ave., Philadelphia 33, Pa.

DARK ROOM ACCESSORIES (X-Ray)
Eastman Kodak Co., Rochester, N. Y.

DARK ROOM PROCESSING (Chemical Tanks, etc.)
Eastman Kodak Co., Rochester, N. Y.

DEGASIFIERS
American-British Chemical Inc., 180 Madison Ave., New York 16.
Foundry Services, Inc., 280 Madison Ave., New York 16, N. Y.
Lithaloys Corporation, 444 Madison Ave., New York.
Pittsburgh Metals Purifying Co., 1352 Marvista St., Pittsburgh 12, Pa.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.
Niagara Falls Smelting & Refining Corp., 2204 Elmwood Ave., Buffalo 17, N. Y.

DEOXIDIZERS
Ajax Metal Co., 46 Richmond St., Philadelphia 23, Pa.
American Smelting & Refining Co., 120 Broadway, New York 5.
Cleveland Flux Co., 1026 Main St., Cleveland 13, O.
Lithaloys Corporation, 444 Madison Ave., New York.
Pittsburgh Metals Purifying Co., 1352 Marvista St., Pittsburgh 12, Pa.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.
Niagara Falls Smelting & Refining Corp., 2204 Elmwood Ave., Buffalo 17, N. Y.

DESULPHURIZERS
Cleveland Flux Co., 1026 Main St., Cleveland 13, O.
Hercules Powder Co., 999 Market St., Wilmington 99, Del.
Mathieson Alkali Works, Inc., 60 E. 42nd St., New York 17, N. Y.
Modern Equipment Co., Port Washington, Wis.
Pittsburgh Metals Purifying Co., 1352 Marvista St., Pittsburgh 12, Pa.
Whiting Corp., 15607 Lathrop Ave., Harvey, Ill.

DIES
Acme Aluminum Alloys Inc. 232 N. Findlay St., Dayton 3, O.
City Pattern Foundry & Machine Co., 1161 Harper Ave., Detroit 11, Mich.

DOWEL PINS
Standard Horse Nail Corp., New Brighton, Pa.

DOWELS (Metal Adjustable)
Kindt-Collins Co., 12653 Elmwood Ave., Cleveland 11, O.

DRILLS (Electric)
Standard Electrical Tool Co., 2488 River Rd., Cincinnati 4, O.

DRILLS (Pneumatic)
Cleveland Pneumatic Tool Co., 3781 E. 77th St., Cleveland 5, Ohio
Gardner-Denver Co., Gardner Drive, Quincy, Ill.
Schrammn Inc., West Chester, Pa.

DRILL PRESSES
Delta Mfg. Co., 620 E. Vienna Ave., Milwaukee 1, Wis.

DRIVES (Reciprocating)
Ajax Flexible Coupling Co., Westfield, N. Y.

DRUMS (Magnetic)
Dings Magnetic Separator Co., 512 E. Smith St., Milwaukee 7, Wis.
Stearns Magnetic Mfg. Co., 662 S. 28th St., Milwaukee 4, Wis.

DUMP BODIES
Brooks Equipment & Mfg. Co., 1402 Davenport Rd., Knoxville 8, Tenn.

DUMP HOPPERS
Buda Company, Harvey, Ill.
Roura Iron Works, 1405 Woodland Ave., Detroit 11, Mich.

DUST ARRESTING EQUIPMENT
American Air Filter Co., Inc., 266 Central Ave., Louisville 8, Ky.
American Foundry Equipment Co., 505 S. Byrkit St., Mishawaka, Ind.
Bartlett & Snow, C. O., Co., 6201 Harvard Ave., Cleveland 5, O.
Buell Engineering Co., 14 Cedar St., New York 5, N. Y.
Kirk & Blum Mfg. Co., 2838 Spring Grove Ave., Cincinnati 25, O.
Mahon, R. C., Co., 8650 Mt. Elliott Ave., Detroit 11, Mich.
Pangborn Corp., Hagerstown, Md.
Parsons Engineering Corp., Cleveland 4, O.
Ruemelin Mfg. Co., 3850 N. Palmer St., Milwaukee 12, Wis.
Schneible Co., Claude B., 2827-25th St., Detroit 16, Mich.
Sly Mfg. Co., W. W., 4753 Train Ave., Cleveland 2, O.
Sturtevant Co., B. F., Div. of Westinghouse Electric Co., Hyde Park, Boston, Mass.
Tabor Mfg. Co., 6225 Tacony St., Philadelphia 35, Pa.
Whiting Corp., 15607 Lathrop Ave., Harvey, Ill.

DUST COLLECTORS
Kindt-Collins Co., 12653 Elmwood Ave., Cleveland 11, O.

DUST RECOVERY SYSTEMS
American Foundry Equipment Co., Mishawaka, Ind.
Buell Engineering Co., 14 Cedar St., New York City 5.
Kirk & Blum Mfg. Co., 2838 Spring Grove Ave., Cincinnati 25, O.
Whiting Corporation, 15607 Lathrop Ave., Harvey, Ill.

ELECTRIC FURNACES (See Furnaces, Electric)

ELECTRODES (Graphite and Amorphous)
International Graphite & Electrode Corp., St. Marys, Pa.
National Carbon Co., Inc., Electrode Sales Div., 30 E. 42nd St., New York 17, N. Y.

ELEVATORS
Standard Conveyor Co., North St. Paul 9, Minn.

ELEVATORS (Bucket)
Bartlett & Snow Co., C. O., 6201 Harvard Ave., Cleveland 5, O.
Jeffrey Mfg. Co., 907 N. Fourth St., Columbus 16, O.
Link Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.

ELEVATORS (Material Handling)
Link Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.

ELEVATORS (Pneumatic, Material Handling)
Fuller Company, Catasaqua, Pa.

ENGINEERING SERVICE (Foundry)
Associated Engineers Inc., 230 E. Berry St., Fort Wayne 2, Ind.
Carman, Edwin S., Lee Rd. at Mayfield, Cleveland 18, O.
Coffey Engineering Co., 308 Park Ave., Plainfield, N. J.
Conover Engineering Co., 1740 East 12th St., Cleveland 14, O.
Emerson Engineers, The, 30 Rockefeller Plaza, New York, N. Y.
Chas. C. Kawin Co., 431 S. Dearborn St., Chicago 5, Ill.
Leighton M. Long & Associates, 604 Nicholas Bldg., Toledo, O.
Lester B. Knight & Associates, 120 So. LaSalle St., Chicago 3, Ill.
Loftus Engineering Co., 610 Smithfield St., Pittsburgh 22, Pa.
Reichert, W. G., Engineering Co., 1060 Broad St., Newark, N. J.
E. R. Steinmann & Associates, 1 DeKalb Ave., Brooklyn 1, N. Y.
Wickland Co., A. A., 205 W. Wacker Dr., Chicago 6, Ill.

EXHAUST SYSTEMS
American Air Filter Co., Inc., 266 Central Ave., Louisville 8, Ky.
American Foundry Equipment Co., 505 S. Byrkit St., Mishawaka, Ind.

EXHAUST SYSTEMS (cont'd)
Kirk & Blum Mfg. Co., 2838 Spring Grove Ave., Cincinnati 25, O.
Pangborn Corporation, Hagerstown, Md.
Parsons Engineering Corp., Cleveland 4, O.
Propellair Inc., Springfield, O.
Schneible Co., Claude B., 2827—25th St., Detroit 16, Mich.
Sly Mfg. Co., W. W., 4753 Train Ave., Cleveland 2, O.
Sturtevant Co., B. F., Div. of Westinghouse Electric Co., Hyde Park, Boston, Mass.
Whiting Corporation, 15607 Lathrop Ave., Harvey, Ill.

FABRICATORS (Metal)
Kirk & Blum Mfg. Co., 2838 Spring Grove Ave., Cincinnati 25, O.
Roura Iron Works, 1405 Woodland Ave., Detroit 11, Mich.

FACINGS
Delta Oil Products Co., Milwaukee 9, Wis.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
National Carbon Co., Inc., Carbon Products Div., 30 E. 42nd St. New York 17, N. Y.
Pennsylvania Foundry Supply & Sand Co., Ashland & E. Lewis St., Philadelphia 24, Pa.
Stevens Inc., Frederic B., Detroit 26, Mich.
United States Graphite Co., Saginaw, Mich.

FANS (Ventilating, Exhaust, Cooling, etc.)
American Foundry Equipment Co., 505 S. Byrkit St., Mishawaka, Ind.
General Blower Co., 406 N. Peoria St., Chicago 22, Ill.
Kirk & Blum Mfg. Co., 2838 Spring Grove Ave., Cincinnati 25, O.
Pangborn Corp., Hagerstown, Md.
Propellair Inc., Springfield, O.
Sturtevant Co., B. F., Div. of Westinghouse Electric Co., Hyde Park, Boston, Mass.

FEEDERS (Rotary)
Muller Company, Catasaqua, Pa.
Link Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.

FEEDERS (Sand)
Bartlett & Snow Co., C. O., 6201 Harvard Ave., Cleveland 5, O.
Jeffrey Mfg. Co., 907 N. Fourth St. Columbus 16, O.
Link Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.

FERROBORON
Molybdenum Corp. of America, Pittsburgh 19, Pa.

FERROCHROME
Hickman-Williams & Co., Cleveland, O.
Electro Metallurgical Sales Corp., 30 E. 42nd St., New York 17, N. Y.
Ohio Ferro-Alloys Corp., Canton 2, O.
Vanadium Corp. of America, 420 Lexington Ave., New York, N. Y.

FERROMANGANESE
Bethlehem Steel Co., Bethlehem, Pa.
Electro Metallurgical Sales Corp., 30 E. 42nd St., New York 17, N. Y.
Ohio Ferro-Alloys Corp., Canton 2, O.

FERROMOLYBDENUM
Climax Molybdenum Co., 500 Fifth Ave., New York 18, N. Y.
Molybdenum Corporation of America, Pittsburgh 19, Pa.

FERROSILICON
Electro Metallurgical Sales Corp., 30 E. 42nd St., New York 17, N. Y.
Globe Iron Co., Jackson, Ohio.
Jackson Iron & Steel Co., Jackson, O.
Keokuk Electro Metals Co., 429 So. 4th St., Keokuk, Iowa.
Miller & Company, 332 S. Michigan Ave., Chicago 4, Ill.
Ohio Ferro-Alloys Corp., Canton 2, O.
Vanadium Corp. of America, 420 Lexington Ave., New York, N. Y.

FERROTITANIUM
Vanadium Corp. of America, 420 Lexington Ave., New York, N. Y.

FERROTUNGSTEN
Electro Metallurgical Sales Corp., 30 E. 42nd St., New York 17, N. Y.
Molybdenum Corp. of America, Pittsburgh 19, Pa.

FERROVANADIUM
Electro Metallurgical Sales Corp., 30 E. 42nd St., New York 17, N. Y.
Vanadium Corp. of America, 420 Lexington Ave., New York, N. Y.

FILLET (Cement & Solvant)
Kindt-Collins Co., 12653 Elmwood Ave., Cleveland 11, O.

FILLET (Wax, leather, wood)
PMS Co., 1701 Power Ave., Cleveland 14, O.

FILM (X-Ray)
Eastman Kodak Co., Rochester, N. Y.

FILTERS (Air)
American Air Filter Co., 266 Central Ave., Louisville 8, Ky.

FIRE BRICK
Babcock & Wilcox, 85 Liberty St., New York 6, N. Y.
Carborundum Co., Perth Amboy, N. J.
Chicago Retort & Firebrick Co., 208 So. LaSalle St., Chicago 4, Ill.
Electro Refractories & Alloys Corp., Vars Bldg., Buffalo 2, N. Y.
Illinois Clay Products Co., Joliet, Ill.
Ironton Fire Brick Co., Ironton, O.
Norton Co., Worcester 6, Mass.
Pennsylvania Foundry Supply & Sand Co., Ashland & E. Lewis St., Philadelphia 24, Pa.
Stevens Inc., Frederic B., Detroit 26, Mich.

FIRE CLAY
Eastern Clay Products, Inc., Eifort, O.
Illinois Clay Products Co., Joliet, Ill.
Ironton Fire Brick Co., Ironton, O.

FIRE SAND
Carborundum Co., Niagara Falls, N. Y.
Cleveland Quarries Co., Guildhall Bldg., Cleveland 15, O.

FIRESTONE
Cleveland Quarries Co., Guildhall Bldg., Cleveland 15, O.

FLASK BANDS
Chicago Mfg. & Distributing Co., 1928 W. 46th St., Chicago 9, Ill.

FLASKS (Aluminum)
Adams Co., Dubuque, Iowa
Fremont Flask Co., Fremont, O.
Hines Flask Co., 1324 Hird Ave., Cleveland 7, O.

FLASKS (Dowmetal)
Fremont Flask Co., Fremont, O.
Hines Flask Co., 1324 Hird Ave., Cleveland 7, O.

FLASK FILLERS
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Dreisbach Engineering Corp., 45 Warburton Ave., Yonkers, N. Y.

METALLOGRAPHIC EQUIPMENT

Buehler Ltd., 228 N. LaSalle St., Chicago 1, Ill.
Harry W. Dietert Co., 9330A Roselawn Ave., Detroit 4, Mich.

METALLURGISTS

Associated Engineers Inc., 230 E. Berry St., Fort Wayne 2, Ind.
Chas. C. Kawin Co., 431 S. Dearborn St., Chicago 5, Ill.
W. G. Reichert Engineering Co., 1060 Broad St., Newark, N. J.

METERS (Gas, Air, Water)

Illinois Testing Laboratories, Inc., 420 N. LaSalle St., Chicago 10, Ill.
Roots-Connersville Blower Corp., Connersville, Ind.

MICROSCOPES

Buehler, Ltd., 228 N. LaSalle, Chicago 1, Ill.

MIXERS (Core Wash)

Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.

MIXERS (Sand and Clay)

American Foundry Equipment Co., 505 S. Byrkit St., Mishawaka, Ind.
Beardsley & Piper Co., The, 2541 N. Keeler Ave., Chicago 39, Ill.
Blystone Division, Standard Sand & Machine Co., 549 W. Washington St., Chicago 6, Ill.
Clearfield Machine Co., Clearfield, Pa.
Construction Machinery Co., Waterloo, Iowa.
Freeman Supply Co., 1152 Broadway Toledo 5, O.
Jeffrey Mfg. Co., 907 N. Fourth St., Columbus 16, O.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.
Rover Foundry & Machine Co., Kingston, Pa.

MOLD CONVEYORS

Bartlett & Snow, C. O., Co., 6201 Harvard Ave., Cleveland 5, O.
Beardsley & Piper Co., The, 2541 N. Keeler Ave., Chicago 39, Ill.
Cleveland Tramrail Div. of Cleveland Crane & Engineering Co., Wickliffe, Ohio.
Foundry Equipment Inc., 100 Grand St., Coldwater, Mich.
Jeffrey Mfg. Co., 907-99 N. Fourth St., Columbus 16, O.
Link Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.
Logan Co., 580 Cabel, Louisville, Ky.
Mathews Conveyer Co., Ellwood City, Pa.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.
Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland 14, O.

MOLD DRYERS

Carl-Mayer Corp., 3030 Euclid Ave., Cleveland 15, Ohio.
Despatch Oven Co., Minneapolis 14, Minn.
Hauck Mfg. Co., 106 Tenth St., Brooklyn 15, N. Y.
Kirk & Blum Mfg. Co., 2838 Spring Grove Ave., Cincinnati 25, O.
Liquid Carbonic Corp., 3110 S. Kedzie Ave., Chicago 23, Ill.
Porbeck Mfg. Co., 2600 N. 9th St., St. Louis, Mo.

MOLD OVENS and DRYERS

Carl-Mayer Corp., 3030 Euclid Ave., Cleveland 15, O.
Despatch Oven Co., Minneapolis 14, Minn.
Foundry Equipment Co., Cleveland 13, O.
Gehnrich Oven Div., W. S. Rockwell Co., 56 Church St., New York 7, N. Y.
Lindy Company, 750 Prospect Ave., Cleveland 15, O.
Maehler, Paul, Co., 2200 W. Lake St., Chicago 12, Ill.
Porbeck Mfg. Co., 2600 N. 9th St., St. Louis, Mo.
Young Bros. Co., 6508 Mack Ave., Detroit 7, Mich.

MOLD TRUCKS (Power Operated)

Clark Tructractor Div. of Clark Equipment Co., Battle Creek, Mich.

MOLDERS BENCHES

Western Tool & Mfg. Co., Springfield, O.

MOLDING MACHINES

Adams Co., Dubuque, Iowa.
Arcade Manufacturing Div. Rockwell Mfg. Co., Freeport, Ill.
Beardsley & Piper Co., The, 2541 N. Keeler Ave., Chicago 39, Ill.
Berkshire Mfg. Co., 1111 Power Ave., Cleveland 14, O.
Champion Foundry & Machine Co., 1314 W. 21st St., Chicago 8, Ill.
Davenport Machine & Foundry Co., Davenport, Iowa.

MOLDING MACHINES (cont'd)

Fellows Corp., 1012 N. Third St., Milwaukee, Wis.
Grimes Molding Machine Co., 4161 Wrightwood Ave., Chicago 39, Ill.
Haynes Foundry Equipment Co., 1734 Lake St., Kalamazoo 21, Mich.
Herman Pneumatic Machine Co., Union Bank Bldg., Pittsburgh 22, Pa.
International Molding Machine Co., 2608 W. 16th St., Chicago 8, Ill.
Johnston & Jennings Co., 867 Addison Rd., Cleveland 14, O.
Milwaukee Foundry Equipment Co., 3238 W. Pierce St., Milwaukee 4, Wis.
Moline Iron Works, 228 Second St., Moline, Ill.
Nicholls, Wm. H., Co., Richmond Hill, Long Island 18, N. Y.
Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland 14, O.
Pioneer Mfg. Co., West Allis, Wis.
S. P. O. Incorporated, 7500 Grand Division Ave., Cleveland 5, O.
Tabor Mfg. Co., 6225 Tacony St., Philadelphia 35, Pa.

MOLDING MACHINES (Jolt)

Adams Co., Dubuque, Iowa.
Champion Foundry & Machine Co., 1314 W. 21st St., Chicago 8, Ill.
Davenport Machine & Foundry Co., Davenport, Iowa.
Grimes Molding Machine Co., 4161 Wrightwood Ave., Chicago 39, Ill.
Haynes Foundry Equipment Co., 1734 Lake St., Kalamazoo 21, Mich.
Herman Pneumatic Machine Co., Union Bank Bldg., Pittsburgh 22, Pa.
International Molding Machine Co., 2608 W. 16th St., Chicago 8, Ill.
Johnston & Jennings Co., 867 Addison Rd., Cleveland 14, O.
Milwaukee Foundry Equipment Co., 3238 W. Pierce St., Milwaukee 4, Wis.
Nicholls, Wm. H., Co., Richmond Hill, Long Island 18, N. Y.
Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland 14, O.
S. P. O. Incorporated, 7500 Grand Division Ave., Cleveland 5, O.

MOLDING MACHINES (Rollover)

Champion Foundry & Machine Co., 1314 W. 21st St., Chicago 8, Ill.
Davenport Machine & Foundry Co., Davenport, Iowa.
Grimes Molding Machine Co., 4161 Wrightwood Ave., Chicago 39, Ill.
Herman Pneumatic Machine Co., Union Bank Bldg., Pittsburgh 22, Pa.
International Molding Machine Co., 2608 W. 16th St., Chicago 8, Ill.
Johnston & Jennings Co., 867 Addison Rd., Cleveland 14, O.
Milwaukee Foundry Equipment Co., 3238 W. Pierce St., Milwaukee 4, Wis.
Nicholls, Wm. H., Co., Richmond Hill, Long Island 18, N. Y.
Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland 14, O.
S. P. O. Incorporated, 7500 Grand Division Ave., Cleveland 5, O.

MOLDING MACHINES (Squeeze)

Acme Alumium Alloys Inc., 232 N. Findlay St., Dayton 3, O.
Adams Co., Dubuque, Iowa.
Champion Foundry & Machine Co., 1314 W. 21st St., Chicago 8, Ill.
Davenport Machine & Foundry Co., Davenport, Iowa.
Haynes Foundry Equipment Co., 1734 Lake St., Kalamazoo 21, Mich.
Herman Pneumatic Machine Co., Union Bank Bldg., Pittsburgh 22, Pa.
International Molding Machine Co., 2608 W. 16th St., Chicago 8, Ill.
Johnston & Jennings Co., 867 Addison Rd., Cleveland 14, O.
Milwaukee Foundry Equipment Co., 3238 W. Pierce St., Milwaukee 4, Wis.
Moline Iron Works, 228 Second St., Moline, Ill.
Nicholls, Wm. H., Co., Richmond Hill, Long Island 18, N. Y.
Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland 14, O.
S. P. O. Incorporated, 7500 Grand Division Ave., Cleveland 5, O.

MOLDING SANDS

Ottawa Silica Co., Ottawa, Ill.
Standard Silica Corp., 209 So. LaSalle St., Chicago 4, Ill.

MOLD WASH

Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
National Carbon Co., Inc., Carbon Products Div., 30 E. 42nd St., New York 17, N. Y.
United States Graphite Co., Saginaw, Mich.

MOLDS (Centrifugal, Graphite)

National Carbon Co., Inc., Carbon Products Div., 30 E. 42nd St., New York 17, N. Y.

MOLYBDENUM

Molybdenum Corporation of America, Pittsburgh 19, Pa.

MONORAIL SYSTEMS

American Monorail Co., 13104 Athens Ave., Cleveland 7, O.
Cleveland Tramrail Div. of Cleveland Crane & Engineering Co., 1155 East 283rd St. Wickliffe, O.
Forker Corp. Div. of Ohio Tramrail, 1826 East 47th St., Cleveland, Ohio.
Link Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.
Modern Equipment Co., Port Washington, Wis.

MOTOR CONTROL

Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

MOTORS (Electric)

Allis-Chalmers Mfg. Co., 1128 S. 70th St., Milwaukee 1, Wis.
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

NAILS (Chill)

Bethlehem Steel Co., Bethlehem, Pa.
Capewell Mfg. Co., Hartford, Conn.
Republic Steel Corp., Cleveland 4, O.
Standard Horse Nail Corp., New Brighton, Pa.

NICKEL

International Nickel Co., Inc., 67 Wall St., New York City 5.

NOZZLES (Blasting)

Alloy Metal Abrasives Co., 311 W. Huron St., Ann Arbor, Mich.
American Foundry Equipment Co., 505 S. Byrkit St., Mishawaka, Ind.
Davenport Machine & Foundry Co., Davenport, Iowa.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
Norton Co., Worcester 6, Mass.
Pangborn Corp., Hagerstown, Md.
W. W. Sly Mfg. Co., 4753 Train Ave., Cleveland 2, O.

OIL BURNERS

Fisher Furnace Co., 5535 N. Wolcott Ave., Chicago 40, Ill.
Stroman Furnace & Engineering Co., Div. of Peterson Oven Co., 300 W. Adams St., Chicago 6, Ill.
North American Mfg. Co., 2910 E. 75th St., Cleveland 4, O.

OPEN HEARTH DOORS

Wm. M. Bailey Co., Pittsburgh, Pa.

OPTICAL PYROMETERS

Buehler, Ltd., 228 N. LaSalle St., Chicago 1, Ill.

OVENS (Annealing and Heat Treating)

Carl-Mayer Corp., 3030 Euclid Ave., Cleveland 15, Ohio.
Despatch Oven Co., Minneapolis 14, Minn.
Electric Furnace Co., W. Wilson St., Salem, Ohio.
Foundry Equipment Co., Cleveland 13, O.
Gehnrich Oven Div., W. S. Rockwell Co., 56 Church St., New York 7, N. Y.
Lanly Company, 750 Prospect Ave., Cleveland 15, O.
Lindberg Engineering Co., 2448 West Hubbard, Chicago 12, Ill.
Maehler, Paul, Co., 2200 W. Lake St., Chicago 12, Ill.
Ross, J. O. Engineering Corp., 350 Madison Ave., New York 17.

OVENS (Annealing and Heat Treating) (cont'd)

Whiting Corp., 15607 Lathrop Ave., Harvey, Ill.
Young Brothers Co., 6508 Mack Ave., Detroit 7, Mich.

OVENS (Core) (See CORE OVENS)

OVENS (Enameling, Japanning)

Carl-Mayer Corp., 3030 Euclid Ave., Cleveland 15, Ohio.
Despatch Oven Co., Minneapolis 14, Minn.
Detroit Sheet Metal Works, 1300 Oakman Blvd., Detroit, Mich.
Gehnrich Oven Div., W. S. Rockwell Co., 56 Church St., New York 7, N. Y.
Industrial Oven Engineering Co., 11621 Detroit Ave., Cleveland, O.
Kirk & Blum Mfg. Co., 2838 Spring Grove Ave., Cincinnati 25, O.
Lanly Co., 750 Prospect Ave., Cleveland 15, Ohio.
Maehler, Paul, Co., 2200 W. Lake St., Chicago 12, Ill.
Mahon, R. C., Co., 8650 Mt. Elliott Ave., Detroit 11, Mich.
Porbeck Mfg. Co., 2600 N. 9th St., St. Louis, Mo.
Young Brothers Co., 6508 Mack Ave., Detroit 7, Mich.

OVENS (Mold)

Carl-Mayer Corp., 3030 Euclid Ave., Cleveland 15, Ohio.
Despatch Oven Co., Minneapolis 14, Minn.
Detroit Sheet Metal Works, 1300 Oakman Blvd., Detroit, Mich.
Gehnrich Oven Div., W. S. Rockwell Co., 56 Church St., New York 7, N. Y.
Kirk & Blum Mfg. Co., 2838 Spring Grove Ave., Cincinnati 25, O.
Lanly Co., 750 Prospect Ave., Cleveland 15, Ohio.
Porbeck Mfg. Co., 2600 N. 9th St., St. Louis, Mo.
Ross, J. O., Engineering Corp., 350 Madison Ave., New York 17, N. Y.

OXYGEN

Air Reduction Sales Co., 60 East 42nd St., New York 17, N. Y.

PARTING COMPOUNDS

Buckeye Products Co., 7022 Vine St., Cincinnati 16, Ohio.
Delta Oil Products Co., Milwaukee 9, Wis.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
Houghton Co., E. F., 303 West Lehigh Ave., Philadelphia 33, Pa.
Midwest Foundry Supply Co., Edwardsville, Ill.
Smith Facing & Supply Co., 1857Carter Rd., Cleveland 13, O.
Frederic B. Stevens, Inc., Detroit 26, Mich.
Tamms Silica Co., 228 N. LaSalle St., Chicago 1, Ill.

PATTERN COATINGS

BRAY Corp., 2961 E. Colorado St., Pasadena 8, Calif.
Kindt-Collins Co., 12653 Elmwood Ave., Cleveland 11, O.
McDougall-Butler Co., 24 Evans St., Buffalo 2, N. Y.
PMS Co., 1701 Power Ave., Cleveland 14, O.

PATTERN COMPOUND

Tamms Silica Co., 228 N. LaSalle St., Chicago 1, Ill.

PATTERN LETTERS

Freeman Supply Co., Toledo 5, O.
Wellman Products Co., 1444 E. 49th St., Cleveland 3, Ohio.

PATTERN LUMBER

Dougherty Lumber Co., Cleveland 5, O.
Freeman Supply Co., Toledo 5, O.
Kindt-Collins Co., 12653 Elmwood Ave., Cleveland 11, Ohio.

PATTERNMAKERS' PLASTER

Kindt-Collins Co., 12653 Elmwood Ave., Cleveland 11, Ohio

PATTERN PLASTER

United States Gypsum Co., 300 W. Adams St., Chicago, Ill.

PATTERN PLATES

Acme Aluminum Alloys Inc., 232 N. Findlay St., Dayton 3, O.
PMS Co., 1701 Power Ave., Cleveland 14, O.

PATTERN PLATES (cont'd)

Buffalo Pattern Works, 830 Hertel Ave., Buffalo, N. Y.
City Pattern Foundry & Machine Co., 1161 Harper Ave., Detroit 11, Mich.
Freeman Supply Co., Toledo 5, O.
Hines Flask Co., 1324 Hird Ave., Cleveland 7, O.
Marathon Chemical Co., Div., Marathon Corp., Rothschild, Wis.
Plaster Process Castings Co., 6922 Carnegie Ave., Cleveland 3, O.
Scientific Cast Products Corp., 1388-92 E. 40th St., Cleveland 3, O.
Wellman Products Co., 1444 E. 49th St., Cleveland 3, Ohio.

PATTERN PLATE STOCK

Freeman Supply Co., 1152 Broadway, Toledo 3, O.
Marathon Corp., Rothschild, Wis.

PATTERN SHOP EQUIPMENT

Delta Mfg. Co., 620 E. Vienna Ave., Milwaukee 1, Wis.
Freeman Supply Co., Toledo 5, O.
Kindt-Collins Co., 12653 Elmwood Ave., Cleveland 11, Ohio.
Oliver Machinery Company, Grand Rapids 2, Mich.
Strand, N. A., Co., 5001 Wolcott Ave., Chicago 40, Ill.
Wellman Products Co., 1444 E. 49th St., Cleveland 3, Ohio.

PATTERNS (Wood, Metal)

Acme Aluminum Alloys Inc., 232 N. Findlay St., Dayton 3, O.
Buffalo Pattern Works, 830 Hertel Ave., Buffalo, N. Y.
Champion Foundry & Machine Co., 1314 W. 21st St., Chicago 8, Ill.
City Pattern Foundry & Machine Co., 1161 Harper Ave., Detroit 11, Mich.
Davis Pattern & Mfg. Co., 16907 Livernois, Detroit 21, Mich.
Hines Flask Co., 1324 Hird Ave., Cleveland 7, O.
Howard Foundry Co., 4900 Bloomingdale Ave., Chicago 39, Ill.
S. P. O. Incorporated, 7500 Grand Division Ave., Cleveland 5, O.

PHOTOGRAPHIC EQUIPMENT

Eastman Kodak Co., Rochester, N. Y.

PHOTOGRAPHY (Industrial)

Eastman Kodak Co., Rochester, N. Y.

PIG CASTING MACHINES

Wm. M. Bailey Co., Pittsburgh, Pa.

PIG IRON

Bethlehem Steel Co., Bethlehem, Pa.
Brooke, E. & G., Iron Co., Birdsboro, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh, Pa.
Globe Iron Co., Jackson, O.
Hanna Furnace Co., Div. of National Steel Corp., Ecorse, Detroit 18, Mich.
Keokuk Electro Metals Co., 429 So. 4th St., Keokuk, Iowa.
Hickman-Williams & Co., Union Commerce Bldg., Cleveland 14, O.
Miller & Company, 332 S. Michigan Ave., Chicago 4, Ill.
Pickands, Mather & Co., Cleveland 14, O.
Republic Steel Corporation, Cleveland 14, O.
Tonawanda Iron Corp., North Tonawanda, N. Y.
Woodward Iron Co., Woodward, Ala.

PIG IRON (Silvery)

Bethlehem Steel Co., Bethlehem, Pa.
Globe Iron Co., Jackson, O.
Hanna Furnace Co., Div. of National Steel Corp., Ecorse, Detroit 18, Mich.
Jackson Iron & Steel Co., Jackson, O.
Keokuk Electro Metals Co., 429 So. 4th St., Keokuk, Iowa.
Miller & Company, 332 S. Michigan Ave., Chicago 4, Ill.

PINS (Flask)

Hines Flask Co., 1324 Hird Ave., Cleveland 7, O.
Kindt-Collins Co., 12653 Elmwood Ave., Cleveland 11, Ohio.

PINS (Flask) (cont'd)

Sterling Wheelbarrow Co., 7100 W. Walker St., Milwaukee 14, Wis.
Truscon Steel Co., Youngstown 1, O.
Wellman Products Co., 1444 E. 49th St., Cleveland 3, Ohio.

PISTON RINGS (for Molding Machines, Compressors, etc.)

Nicholls, Wm. H., Co., Richmond Hill, Long Island 18, N. Y.

PLASTER OF PARIS

United States Gypsum Co., 300 W. Adams St., Chicago, Ill.

PLATES (Bottom)

Adams Co., Dubuque, Iowa.
Sterling Wheelbarrow Co., 7100 W. Walker St., Milwaukee 14, Wis.

PLATES (Core Drying)

Champion Foundry & Machine Co., 1314 W. 21st St., Chicago 8, Ill.
Johns-Manville, 22 East 40th St., New York City 16.

PLUMBAGO

Bloomsbury Graphite Co., Bloomsbury, N. J.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
Frederic B. Stevens, Inc., Detroit 26, Mich.
United States Graphite Co., Saginaw, Mich.

PNEUMATIC TOOLS

Chicago Pneumatic Tool Co., General Offices: 8 East 44th St., New York 17, N. Y.
Cleveland Pneumatic Tool Co., 3781 E. 77th St., Cleveland 5, Ohio.
Gardner-Denver Co., Gardner Drive, Quincy, Ill.
Independent Pneumatic Tool Co., 600 West Jackson Blvd., Chicago 6, Ill.
Keller Tool Co., Grand Haven, Mich.
Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.
Schramm Inc., West Chester, Pa.

POLISHING MACHINERY

Strand, N. A., Co., 5001 N. Wolcott Ave., Chicago 40, Ill.

POURING DEVICES

Modern Equipment Co., Port Washington, Wis.
Whiting Corp., 15607 Lathrop Ave., Harvey, Ill.

POWDERED COAL EQUIPMENT

Whiting Corp., 15607 Lathrop Ave., Harvey, Ill.

PRESSER BOARDS

Adams Co., Dubuque, Iowa.
Chicago Mfg. & Distributing Co., 1928 W. 46th St., Chicago 9, Ill.

PRESSURE CASTING SEALER

Empire Varnish Co., 2656 E. 76th St., Cleveland 4, O.

PULLEYS (Magnetic)

Dings Magnetic Separator Co., 512 E. Smith St., Milwaukee 7, Wis.
Stearns Magnetic Mfg. Co., 662 S. 28th St., Milwaukee 4, Wis.

PUMPS

Construction Machinery Co., Waterloo, Iowa.
Gardner-Denver Co., Gardner Drive, Quincy, Ill.

PUMPS (Dry, Vacuum)

Fuller Company, Catasauqua, Pa.
Roots-Connersville Blower Corp., Connersville, Ind.

PURIFIERS

Cleveland Flux Co., 1026 Main St., Cleveland 13, O.

PUSH-OFF MACHINES

Champion Foundry & Machine Co., 1314 West 21st St., Chicago 8, Ill.
International Molding Machine Co., 2608 W. 16th St., Chicago 8, Ill.
Milwaukee Foundry Equipment Co., 3238 W. Pierce St., Milwaukee 4, Wis.

PYROMETERS

Harry W. Dietert Co., 9330A Roselawn Ave., Detroit 4, Mich.
Claude S. Gordon Co., 3000 So. Wallace, Chicago 9, Ill.
Illinois Testing Laboratories, Inc., 420 N. LaSalle St., Chicago 10, Ill.
Marshall Co., L. H., 270 W. Lane, Columbus 1, O.
Pyrometer Instrument Co., 106 Lafayette St., New York 13.
Tamms Silica Co., 228 N. LaSalle St., Chicago 1, Ill.

RADIOGRAPHY (Industrial)

Eastman Kodak Co., Rochester, N. Y.
Radium Chemical Co., Inc., 570 Lexington Ave., New York 22, N. Y.
Tamms Silica Co., 228 N. LaSalle St., Chicago 1, Ill.

RADIUM

Radium Chemical Co., Inc., 570 Lexington Ave., New York 22, N. Y.

RAMMERS

Independent Pneumatic Tool Co., 600 West Jackson Blvd., Chicago 6, Ill.
Keller Tool Co., Grand Haven, Mich.

RAPPING PLATES

Kindt-Collins Co., 12653 Elmwood Ave., Cleveland 11, O.

REFRACTORIES

Babcock & Wilcox, 85 Liberty St., New York 6, N. Y.
Carborundum Co., Niagara Falls, N. Y.
Carborundum Co., Perth Amboy, N. J.
Chicago Retort & Firebrick Co., 208 So. LaSalle St., Chicago 4, Ill.
Cleveland Quarries Co., Guildhall Bldg., Cleveland 15, O.
Eastern Clay Products, Inc., Eifort, O.
Electro Refractories & Alloys Corp., Vars Bldg., Buffalo 2, N. Y.
Fisher Furnace Co., 5535 N. Wolcott Ave., Chicago 40, Ill.
Ironton Fire Brick Co., Ironton, O.
Nock and Sons Co., 1243 East 55th St., Cleveland 14, Ohio.
Norton Co., Worcester 6, Mass.
United States Graphite Co., Saginaw, Mich.

REGULATORS (Pressure)

Liquid Carbonic Corp., 3110 S. Kedzie Ave., Chicago 23, Ill.

REPAIR PARTS (Molding Machine)

Pioneer Mfg. Co., West Allis, Wis.

RESPIRATORS

Chicago Eye Shield Co., 2300 West Warren, Chicago 12, Ill.
Mine Safety Appliances Co., Braddock, Thomas and Meade Sts., Pittsburgh 8, Pa.
Willson Products Inc., Reading, Pa.

RIDDLES

Chicago Mfg. & Distributing Co., 1928 W. 46th St., Chicago 9, Ill.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
Pennsylvania Foundry Supply & Sand Co., Ashland & E. Lewis St., Philadelphia 24, Pa.

RIDDLES (Electric)

Champion Foundry & Machine Co., 1314 W. 21st St., Chicago 8, Ill.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
Foundry Supplies & Mfg. Co., 2221 Orchard St., Chicago 14, Ill.
Great Western Mfg. Co., Leavenworth, Kans.

RIDDLES (Hand)

Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.

RISER RODS (Graphite)

National Carbon Co., Inc., Carbon Products Div., 30 E. 42nd St., New York 17, N. Y.

RODS (Steel)

Republic Steel Corp., Cleveland 4, O.

ROD STRAIGHTENERS

American Foundry Equipment Co., 505 S. Byrkit St., Mishawaka, Ind.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
Kane & Roach, Syracuse, N. Y.

ROLLER-HEARTH FURNACES (Electric Annealing)

General Electric Co., Schenectady, N. Y.

RUBBER LINING MATERIAL (Abrasive Resisting)

Pangborn Corp., Hagerstown, Md.

RUST PREVENTATIVES

Houghton Co., E. F., 303 West Lehigh Ave., Philadelphia 33, Pa.

SAFETY CLOTHING

American Optical Co., Southbridge, Mass.
Chicago Eye Shield Co., 2300 West Warren, Chicago 12, Ill.
Mine Safety Appliances Co., Braddock, Thomas and Meade Sts., Pittsburgh 8, Pa.

SALT and SALT TABLETS

Mine Safety Appliances Co., Braddock, Thomas and Meade Sts., Pittsburgh 8, Pa.

SANDS (Core, Molding, Blasting)

Carpenter Brothers, Inc., 606 West Wisconsin, Milwaukee 3, Wis.
Hoffman Foundry Supply Co., 1193 Main St., Cleveland, Ohio
Midwest Foundry Supply Co., Edwardsville, Ill.
Ottawa Silica Co., Ottawa, Ill.
Pangborn Corp., Hagerstown, Md.
Pennsylvania Foundry Supply & Sand Co., Ashland & E. Lewis St., Philadelphia 24, Pa.
Producers Core Sand Corp., Michigan City, Ind.
Standard Slica Corp., 209 So. LaSalle St., Chicago 4, Ill.

SAND BLAST BARRELS

Alloy Metal Abrasives Co., 311 W. Huron St., Ann Arbor, Mich.
American Foundry Equipment Co., 505 S. Byrkit St., Mishawaka, Ind.
Hydro-Blast Corp., 2550 N. Western Ave., Chicago 47, Ill.
Pangborn Corp., Hagerstown, Md.
Tabor Mfg. Co., 6225 Tacony St., Philadelphia 35, Pa.
Sly Mfg. Co., W. W., 4753 Train Ave., Cleveland 2, O.

SAND BLAST CABINETS

American Foundry Equipment Co., 505 S. Byrkit St., Mishawaka, Ind.
Pangborn Corp., Hagerstown, Md.

SAND BLAST EQUIPMENT

Alloy Metal Abrasives Co., 311 W. Huron St., Ann Arbor, Mich.
American Air Filter Co., 266 Central Ave., Louisville 8, Ky.
American Foundry Equipment Co., 505 S. Byrkit St., Mishawaka, Ind.
Hydro-Blast Corp., 2550 N. Western Ave., Chicago 47, Ill.
Pangborn Corp., Hagerstown, Md.
Parsons Engineering Corp., Cleveland 4, O.
Ruemelin Mfg. Co., 3850 North Palmer St., Milwaukee 12, Wis.
Tabor Mfg. Co., 6225 Tacony St., Philadelphia 35, Pa.
Sly Mfg. Co., W. W., 4753 Train Ave., Cleveland 2, O.

SAND BLAST NOZZLES

American Foundry Equipment Co., 505 S. Byrkit St., Mishawaka, Ind.
Norton Company, Worcester 6, Mass.
Pangborn Corp., Hagerstown, Md.
Ruemelin Mfg. Co., 3850 N. Palmer St., Milwaukee 12, Wis.
Sly, W. W., Mfg. Co., 4753 Train Ave., Cleveland 2, O.

SAND BLAST ROOMS

Alloy Metal Abrasives Co., 311 W. Huron St., Ann Arbor, Mich.
American Foundry Equipment Co. 505 S. Byrkit St., Mishawaka, Ind.

SAND BLAST ROOMS (cont'd)

Hydro-Blast Corp., 2550 N. Western Ave., Chicago 47, Ill.
Pangborn Corp., Hagerstown, Md.
Parsons Engineering Corp., Cleveland 4, O.
Ruemelin Mfg. Co., 3850 N. Palmer St., Milwaukee 12, Wis.
Sly Mfg. Co., W. W., 4753 Train Ave., Cleveland 2, O.

SAND BLAST TABLES

American Foundry Equipment Co., 505 S. Byrkit St., Mishawaka, Ind.
Pangborn Corp., Hagerstown, Md.
Sly Mfg. Co., W. W., 4753 Train Ave., Cleveland 2, O.

SAND CONTROL and TESTING EQUIPMENT

Harry W. Dietert Co., 9330A Roselawn Ave., Detroit 4, Mich.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.

SAND CONVEYING and HANDLING EQUIPMENT

American Air Filter Co., 266 Central Ave., Louisville 8, Ky.
C. O. Bartlett & Snow Co., 6201 Harvard Ave., Cleveland 5, O.
Beardsley & Piper Co., The, 2541 N. Keeler Ave., Chicago 39, Ill.
Clearfield Machine Co., Clearfield, Pa.
Cleveland Tramrail Div. of Cleveland Crane & Engineering Co., Wickliffe, Ohio.
Coaltoter Conveyor Co., 310 So. Michigan, Chicago 4, Ill.
Jeffrey Mfg. Co., 907-99 N. Fourth St., Columbus 16, O.
Link Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.
Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland 14, O.
Penn Iron Works, Reading, Pa.
Royer Foundry & Machine Co., Kingston, Pa.

SAND CONVEYING and HANDLING EQUIPMENT (Pneumatic)

Ajax Flexible Coupling Co., Westfield, N. Y.
Clark Tructractor Div. of Clark Equipment Co., Battle Creek, Mich.
Fuller Company, Catasaqua, Pa.
Frank G. Hough Co., Libertyville, Ill.
Robins Conveyors Inc., 70 Pine St., New York 5, N. Y.

SAND DRYERS

Allis-Chalmers Mfg. Co., 1126 S. 70th St., Milwaukee 1, Wis.
Bartlett & Snow Co., C. O., 6201 Harvard Ave., Cleveland 5, O.
Link Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.

SAND ENGINEERING SERVICE

Minco Products Corp., Saginaw, Mich.

SANDING MACHINERY

Delta Mfg. Co., Industrial Division, 620 E. Vienna Ave., Milwaukee 1, Wis.
Oliver Machinery Company, Grand Rapids 2, Mich.

SANDING MACHINERY (Electric Portable)

Delta Mfg. Co., 620 E. Vienna Ave., Milwaukee 1, Wis.

SAND MEASURING and WEIGHING DEVICES

Baker Perkins Inc., Saginaw, Mich.
Link Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.

SAND MIXERS

American Foundry Equipment Co., 505 S. Byrkit St., Mishawaka, Ind.
Baker Perkins Inc., Saginaw, Mich.
Beardsley & Piper Co., The, 2451 N. Keeler Ave., Chicago 39, Ill.

SAND MIXERS (cont'd)

Blystone Division
Standard Sand & Machine Co., 549 W. Washington Blvd., Chicago 6, Ill.
Clearfield Machine Co., Clearfield, Pa.
Construction Machinery Corp., Waterloo, Iowa.
Link Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.
Royer Foundry & Machine Co., Kingston, Pa.

SAND PREPARATION EQUIPMENT

Ajax Flexible Coupling Co., Westfield, N. Y.
Allis-Chalmers Mfg. Co., 1126 S. 70th St., Milwaukee 1, Wis.
American Foundry Equipment Co., 505 S. Byrkit St., Mishawaka, Ind.
Baker Perkins Inc., Saginaw, Mich.
Bartlett & Snow Co., C. O., 6201 Harvard Ave., Cleveland 5, O.
Beardsley & Piper Co., The, 2541 N Keeler Ave., Chicago 39, Ill.
Clearfield Machine Co., Clearfield, Pa.
Grimes Molding Machine Co., 1429 Virginia Park, Detroit 6, Mich.
Hydro-Blast Corp., 2550 N. Western Ave., Chicago 47, Ill.
Jeffrey Mfg. Co., 907-99 N. Fourth St., Columbus 16, O.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.
Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland 14, O.
Royer Foundry & Machine Co., Kingston, Pa.
Screen Equipment Co., Buffalo, N. Y.
Simplicity Engineering Co., Durand, Mich.

SAND RAMMERS

Chicago Mfg. & Distributing Co., 1928 W. 46th St., Chicago 9, Ill.
Chicago Pneumatic Tool Co., General Offices: 8 East 44th St., New York 17, N. Y.
Cleveland Pneumatic Tool Co., 3781 E. 77th St., Cleveland 5, Ohio.
Dayton Pneumatic Tool Co., Dayton 1, O.
Herman Pneumatic Machine Co., Union Bank Bldg., Pittsburgh 22, Pa.
Keller Tool Co., Grand Haven, Mich.

SAND RECLAIMERS

Hydro-Blast Corp., 2550 N. Western Ave., Chicago 47, Ill.
Jeffrey Mfg. Co., 907 N. Fourth St., Columbus 16, O.
Link Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.
Nichols Engineering & Research Corp., 60 Wall Tower, New York 5, N. Y.
Stearns Magnetic Mfg. Co., 662 S. 28th St., Milwaukee 4, Wis.

SAND SIFTING and SCREENING MACHINERY

Allis-Chalmers Mfg. Co., 1126 S. 70th St., Milwaukee 1, Wis.
American Air Filter Co., 266 Central Ave., Louisville 8, Ky.
Bartlett & Snow, C. O., Co., 6201 Harvard Ave., Cleveland 5, Ohio.
Champion Foundry & Machine Co., 1314 W. 21st St., Chicago 8, Ill.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
Foundry Supplies & Mfg. Co., 2221 Orchard St., Chicago 14, Ill.
Great Western Mfg. Co., Leavenworth, Kansas.
Link Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.
Royer Foundry & Machine Co., Kingston, Pa.
Screen Equipment Co., Buffalo, N. Y.

SAND SIFTING and SCREENING MACHINERY (cont'd)

Simplicity Engineering Co., Durand, Mich.
Pangborn Corp., Hagerstown, Md.
Whiting Corporation, 15607 Lathrop Ave., Harvey, Ill.

SAND STORAGE BINS & GATES

Bartlett & Snow, C. O., Co. 6201 Harvard Ave., Cleveland 5, Ohio.
Beardsley & Piper Co., The, 2541 N. Keeler Ave., Chicago 39, Ill
Jeffrey Mfg. Co., 907 N. Fourth St., Columbus 16, O.
Link Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill
Neff & Fry Co., Camden, O.

SAWS (Band, Metal, Wood)

Delta Mfg. Co., 620 E. Vienna Ave., Milwaukee 1, Wis.
Oliver Machinery Company, Grand Rapids 2, Mich.

SAWS (Cold Metal)

Bethlehem Steel Co., Bethlehem, Pa.
Tabor Mfg. Co., 6225 Tacony St., Philadelphia 35, Pa.

SAWS (Masonry)

Clipper Mfg. Co., 4030 Manchester, St. Louis, Mo.

SCALING HAMMERS

Dayton Pneumatic Tool Co., Dayton 1, O.
Independent Pneumatic Tool Co., 600 West Jackson Blvd., Chicago 6, Ill.
Keller Tool Company, Grand Haven, Mich.
Schramm, Inc., West Chester, Pa.

SCREENS (Shake-Out)

Allis-Chalmers Mfg. Co., 1126 S. 70th St., Milwaukee 1, Wis.
C. O. Bartlett & Snow Co., 6201 Harvard Ave., Cleveland 5, O
Beardsley & Piper Co., The, 2541 N. Keeler Ave., Chicago 39, Ill.
Jeffrey Mfg. Co., 907 N. Fourth St., Columbus 16, O.
National Engineering Co., 549 W Washington St., Chicago 6, Ill.
Screen Equipment Co., Buffalo, N. Y.
Simplicity Engineering Co., Durand, Mich.

SCREENS (Vibrating)

Ajax Flexible Coupling Co., Westfield, N. Y.
Link Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.
Robins Conveyors, Inc., 70 Pine St., New York 5, N. Y.
Screen Equipment Co., Buffalo, N. Y.

SEA COAL

Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O
Smith Facing & Supply Co., 1857 Carter Rd., Cleveland 13, O.
Frederic B. Stevens, Inc., Detroit 26, Mich.
Midwest Foundry Supply Co., Edwardsville, Ill.

SEALERS (Castings)

Kerkling & Co., Burbank, Calif.

SEPARATORS (Abrasive)

American Foundry Equipment Co., 5505 S. Byrkit St., Mishawaka, Ind.
Pangborn Corp., Hagerstown, Md.

SEPARATORS (Air, Moisture, Oil)

American Air Filter Co., 266 Central Ave., Louisville 8, Ky.
American Foundry Equipment Co. 505 S. Byrkit St., Mishawaka, Ind
Chicago Mfg. & Distributing Co., 1928 W. 46th St., Chicago 9, Ill
Johnson Corporation, Three Rivers, Mich.
Jas. A. Murphy & Co., Hamilton, O.
Pangborn Corp., Hagerstown, Md.

SEPARATORS (Magnetic)

Beardsley & Piper Co., The, 2541 N. Keeler Ave., Chicago 39, Ill.

SEPARATORS (Magnetic) (cont'd)

Dings Magnetic Mfg. Co., E. Smith St., Milwaukee 7, Wis
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.
Stearns Magnetic Mfg. Co., 662 S. 28th St., Milwaukee 4, Wis.

SHAKE-OUT MACHINERY

Allis-Chalmers Mfg. Co., 1126 S. 70th St., Milwaukee 1, Wis.
American Air Filter Co., 266 Central Ave., Louisville 8, Ky.
C. O. Bartlett & Snow Co., 6201 Harvard Ave., Cleveland 5, O
Beardsley & Piper Co., The, 2541 N. Keeler Ave., Chicago 39, Ill
Herman Pneumatic Machine Co., Union Bank Bldg., Pittsburgh 22, Pa.
Link Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.
New Haven Vibrator Co., 131 Chestnut St., New Haven 7, Conn.
Robins Conveyors, Inc., 70 Pine St., New York 5, N. Y.
Royer Foundry & Machine Co., Kingston, Pa.
Simplicity Engineering Co., Durand, Mich.

SHOT AND GRIT

Alloy Metal Abrasive Co., 311 W. Huron St., Ann Arbor, Mich.
American Foundry Equipment Co., 505 S. Byrkit St., Mishawaka, Ind.
American Steel Abrasives Co., Galion, O.
Carpenter Brothers, Inc., 606 West Wisconsin, Milwaukee 3, Wis.
Cleveland Metal Abrasives Co., 887 E. 67th St., Cleveland, Ohio.
Globe Steel Abrasive Co., Mansfield, O.
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Pangborn Corp., Hagerstown, Md.
Pennsylvania Foundry Supply & Sand Co., Ashland & E. Lewis Sts., Philadelphia 24, Pa.
Pittsburgh Crushed Steel Co., Pittsburgh 1, Pa.
National Metal Abrasive Co., 3560 Norton Ave., Cleveland 7, O.
Sly Mfg. Co., W. W., 4753 Train Ave., Cleveland 2, O
Steel Shot & Grit Co. Inc., 39 Warren Ave., Boston, Mass.
Western Metal Abrasive Co., 2545 East 79th St., Cleveland 4, Ohio.

SHOT (Peening)

Alloy Metal Abrasive Co., 311 W. Huron St., Ann Arbor, Mich.
American Steel Abrasives Co., Galion, O.
Cleveland Metal Abrasive Co., 887 E. 67th St., Cleveland, Ohio
Globe Steel Abrasive Co., Mansfield, Ohio.
National Metal Abrasive Co., 3560 Norton Ave., Cleveland 7, O.
Pittsburgh Crushed Steel Co., Pittsburgh 1, Pa.
Steel Shot & Grit Co., Inc., 39 Warren Ave., Boston, Mass.
Western Metal Abrasive Co., 2545 E. 79th St., Cleveland 4, O.

SHOVELS

Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
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Electro Metallurgical Sales Corp., 30 E. 42nd St., New York 17, N. Y.

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Gardner-Denver Co., Gardner Drive, Quincy, Ill.
Link Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.
Whiting Corporation, 15607 Lathrop Ave., Harvey, Ill

SLIP FLASKS

Adams Co., Dubuque, Iowa.
Hines Flask Co., 1324 Hird Ave., Cleveland 7, O.

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Chicago Mfg. & Distributing Co., 1928 W. 46th St., Chicago 9, Ill.
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Fremont Flask Co., Fremont, O.
Hines Flask Co., 1324 Hird Ave., Cleveland 7, O.

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Niagara Falls Smelting & Refining Corp., 2204 Elmwood Ave., Buffalo 17, N. Y.

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Murphy & Co., Jas. A., Hamilton, O.
New Haven Vibrator Co., 131 Chestnut St., New Haven 7, Conn

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Adams Co., Dubuque, Iowa
Freeman Supply Co., Toledo 5, O.
Milwaukee Chaplet & Mfg. Co., 1023 S. 40th St., Milwaukee, Wis.

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STEEL (Structural)

American Bridge Co., Pittsburgh 19, Pa.
Bethlehem Steel Co., Bethlehem, Pa.

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Davenport Machine & Foundry Co., Davenport, Iowa.
International Molding Machine Co., 2608 W. 16th St., Chicago 8, Ill.
Milwaukee Foundry Equipment Co., 3238 W. Pierce St., Milwaukee, Wis.

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N. Ransohoff, Inc., 208 W. 71st St., Cincinnati 16, O.

TAPER PINS
Standard Horse Nail Corp., New Brighton, Pa.

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Illinois Testing Laboratories, 418 N. LaSalle St., Chicago 10, Ill.
Marshall Co., L. H., 270 W. Lane Columbus 1, O.

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Harry W. Dietert Co., 9330A Roselawn Ave., Detroit 4, Mich.
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TIN
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Dayton Pneumatic Tool Co., Dayton 1, O.
Gardner-Denver Co., Gardner Drive, Quincy, Ill.
Independent Pneumatic Tool Co., 600 West Jackson Blvd., Chicago 6, Ill.
Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.
Keller Tool Co., Grand Haven, Mich.
Schramm Inc., West Chester, Pa.

TORCHES and BURNERS (Acetylene, gas, oil)
Freeman Supply Co., Toledo 5, O.
Liquid Carbonic Corp., 3110 S. Kedzie Ave., Chicago 23, Ill.
North American Mfg. Co., 2910 E. 75th St., Cleveland 4, O

TOTE BOXES
Cleveland Wire Spring Co., United Bank Bldg., Cleveland 9, O.

TRACTORS (Gas Powered)
Clark Tructractor Div. of Clark Equipment Co., Battle Creek, Mich.

TRAMRAIL SYSTEMS
American MonoRail Co., 13104 Athens Ave., Cleveland 7, O.

TRAMRAIL SYSTEMS (cont'd)
Cleveland Tramrail Div. of Cleveland Crane & Engineering Co. 1155 East 283rd St., Wickliffe, O
Forker Corp. Div. of Ohio Tramrail, 1826 East 47th St., Cleveland, Ohio
Link Belt Co., 300 W. Pershing Rd. Chicago 9, Ill.
Modern Equipment Co., Port Washington, Wis.

TRAPS (Steam)
Johnson Corporation, Three Rivers, Mich.

TROLLEYS
Curtis Pneumatic Machinery Co., 1922 Kienlen Ave., St. Louis 20, Mo.
Modern Equipment Co., Port Washington, Wis.

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Philco Storage Battery Div., Philco Corporation, Trenton, N. J.

TRUCK CRANES
Elwell-Parker Electric Co., 4205 St. Clair Ave., Cleveland, O.
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Lift Trucks Inc., 2425 Spring Grove Ave., Cincinnati 14, Ohio

TRUCKS (Industrial)
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Lift Trucks Inc., 2425 Spring Grove Ave., Cincinnati 14, Ohio.

TRUCKS (Motorized Hand Lift)
Automatic Transportation Co., 121 West 87th St., Chicago 20, Ill

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Automatic Transportation Co., 121 West 87th St., Chicago 20, Ill.
Clark Tructractor Div. of Clark Equipment Co., Battle Creek, Mich.
Elwell-Parker Electric Co., 4205 St. Clair Ave., Cleveland, Ohio.
Lift Trucks Inc., 2425 Spring Grove Ave., Cincinnati 14, Ohio.

TRUCK WHEELS
Bethlehem Steel Co., Bethlehem, Pa
Sterling Wheelbarrow Co., 7100 W Walker St., Milwaukee 14, Wis.

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Cleveland Chaplet & Mfg. Co., 1197 West 67th St., Cleveland 2, O.
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Sly Mfg. Co., W. W., 4753 Train Ave., Cleveland 2, O
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Foundry Equipment, Inc., 100 Grand St., Coldwater, Mich.
Modern Equipment Co., Port Washington, Wis.
Whiting Corporation, 15607 Lathrop Ave., Harvey, Ill.

UNLOADERS (Portable-Gas Electric)
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Air-Way Pump & Equipment Co. 405 S. Jefferson St., Chicago 7, Ill.
Cleveland Vibrator Co., 2828 Clinton Ave., W., Cleveland 13, Ohio.
North American Mfg. Co., 2910 E. 75th St., Cleveland 4, O

VALVES (Air, Water, Steam) (cont'd)

VALVES (Adjustable Orifice)
North American Mfg. Co., 2910 E. 75th St., Cleveland 4, O

VALVES (Blow-off and Cut-off)
Champion Foundry & Machine Co., 1314 W. 21st St., Chicago 8, Ill.
Cleveland Vibrator Co., 2828 Clinton Ave., W., Cleveland 13, O
Wm. H. Nicholls Co., Richmond Hill, Long Island 18, N. Y.

VENTILATING SYSTEMS
American Foundry Equipment Co. 505 S. Byrkit St., Mishawaka, Ind.
Kirk & Blum Mfg. Co., 2838 Spring Grove Ave., Cincinnati 25, O.
Pangborn Corp., Hagerstown, Md
Parsons Engineering Co., Cleveland 4, O.
Schneible Co., Claude B., 2827—25th St., Detroit 16, Mich
W. W. Sly Mfg. Co., 4753 Train Ave., Cleveland 2, O.
Sturtevant Co., B. F., Div. of Westinghouse Electric Co., Hyde Park, Boston, Mass.
Swartwout Co., 1851 Euclid Ave., Cleveland 15, Ohio.

VENTILATORS (Roof)
Swartwout Co., 1851 Euclid Ave., Cleveland 15, Ohio.

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Champion Foundry & Machine Co., 1314 W. 21st St., Chicago 8, Ill
Demmler & Bros., Wm., Kewanee, Ill.
Reinacker Industries, 2035 Hilton Rd., Ferndale, Mich.
Sinel Co., 1405 Philadelphia Drive, Dayton 6, O.
C. M. Smillie & Co., 1100 Woodward Hgts. Blvd., Ferndale, Mich

VIBRATORS
Adams Co., Dubuque, Iowa.
Beardsley & Piper Co., The, 2541 N. Keeler Ave., Chicago 39, Ill.
Cleveland Vibrator Co., 2828 Clinton Ave., W., Cleveland 13, Ohio.
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Foundry Supplies & Mfg. Co., 2221 Orchard St., Chicago 14, Ill.
Freeman Supply Co., 1152 Broadway, Toledo 5, O.
Herman Pneumatic Machine Co., Union Bank Bldg., Pittsburgh 22, Pa.
Kindt-Collins Co., 12653 Elmwood Ave., Cleveland 11, O.
Link Belt Co., 300 W. Pershing Rd., Chicago, Ill.
Martin Engineering Co., Kewanee, Ill.
Milwaukee Foundry Equipment Co., 3238 W. Pierce St., Milwaukee, Wis.
New Haven Vibrator Co., 131 Chestnut St., New Haven 7, Conn.
Nicholls Co., Wm. H., Richmond Hill, Long Island 18, N. Y.
Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland 14, O.
Pennsylvania Foundry Supply & Sand Co., Ashland & E. Lewis Sts., Philadelphia 24, Pa.
S P O Incorporated, 7500 Grand Division Ave., Cleveland 5, O.
Syntron Company, Homer City, Pa
Tabor Mfg. Co., 6225 Tacony St., Philadelphia 35, Pa.

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Bradley Washfountain Co., 2217 W. Michigan St., Milwaukee, Wis.

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PMS Co., 1701 Power Ave., Cleveland 14, O.
United Compound Co., Inc., 328 South Park Ave., Buffalo 4, N. Y.

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Chicago Mfg. & Distributing Co. 1928 W. 46th St., Chicago 9, Ill.
Sterling Wheelbarrow Co., 7100 W. Walker St., Milwaukee 14, Wis.

WELDING GAS
Air Reduction Sales Co., 60 East 42nd St., New York 17, N. Y.
Liquid Carbonic Corp., 3110 S. Kedzie Ave., Chicago 23, Ill.

WELDING APPARATUS (Electric Arc)
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

WELDING and CUTTING APPARATUS and SUPPLIES
Air Reduction Sales Co., 60 East 42nd St., New York 17, N. Y.
Liquid Carbonic Corp., 3110 S. Kedzie Ave., Chicago 23, Ill.

WELDING ELECTRODES (Carbon)
National Carbon Co., Carbon Products Div., 30 E. 42nd St., New York 17, N. Y.

WELDING RODS & ELECTRODES
Air Reduction Sales Co., 60 East 42nd St., New York 17, N. Y.
International Nickel Co., Inc., 67 Wall St., New York 5, N. Y.

WHEELBARROWS
Construction Machinery Corp., Waterloo, Iowa.
Sterling Wheelbarrow Co., 7100 W. Walker St., Milwaukee 14, Wis.

WHEELS, ABRASIVE (Cut-off)
Bay State Abrasive Products Co., Westboro, Mass.
Carborundum Co., Perth Amboy, N. J.
Electro Refractories & Alloys Corp., Vars Bldg., Buffalo 2, N. Y.
General Grinding Wheel Corp., West Abrasives, Inc., 3132 East Thompson St., Philadelphia, Pa.
Independent Pneumatic Tool Co., 600 West Jackson Blvd., Chicago 6, Ill.
Raybestos Manhattan, Inc., Manhattan Rubber Division, Passaic, N. J.
Macklin Co., Jackson, Mich.
Mid West Abrasive Co., Detroit, Mich.
Norton Company, Worcester 6, Mass.
Peninsular Grinding Wheel Co., 729 Meldrum Ave., Detroit, Mich.
Safety Grinding Wheel & Machine Co., Springfield, Ohio.
Simonds Abrasive Co., Tacony & Fraley Sts., Philadelphia 37, Pa.
Sterling Grinding Wheel Division, Cleveland Quarries Co., Tiffin, Ohio.

WHEELS (Wire)
Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland 14, O.

WIRE BRUSHES
Independent Pneumatic Tool Co., 600 West Jackson Blvd., Chicago 6, Ill.
Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland 14, O.

WIRE NAILS
Bethlehem Steel Co., Bethlehem, Pa.
Republic Steel Corp., Cleveland 4, O.

WOODWORKING MACHINERY
Delta Mfg. Co., 620 E. Vienna Ave., Milwaukee 1, Wis.
Freeman Supply Co., 1152 Broadway, Toledo 5, O.
Kindt-Collins Co., 12653 Elmwood Ave., Cleveland 11, Ohio.
Oliver Machinery Co., Grand Rapids 2, Mich.

X-RAY EQUIPMENT
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

X-RAY FILMS
Eastman Kodak Co., Rochester, N. Y.

X-RAY INSPECTION
Magnaflux Corporation, 5910 Northwest Highway, Chicago 41, Ill.

ZINC
American Smelting & Refining Co., 120 Broadway, New York 5, N. Y.

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CORE ROOM SUPERVISOR

Well established Eastern foundry looking for Core Room Supervisor—experienced in jobbing and production work. Must be able to handle men and women core makers and have good knowledge of core making—bench, machine and core blowing. Good opportunity for the right man. Send complete details of qualifications, age and salary desired.

BOX 639
The FOUNDRY CLEVELAND 13, OHIO

SHOT & GRIT
SERVICE & SALES

Midwest Shot & Grit mfr. has opening for technical or practical man who understands all operations of cleaning and blasting equipment in connection with uses of Shot & Grit to service consumers and help educate salesmen and distributors. Selling and shop background an asset. Good opportunity. Salary commensurate.

BOX 618
The FOUNDRY CLEVELAND 13, OHIO

FOUNDRY FOREMAN

By well established Pennsylvania Foundry employing 200, to take charge of Gray Iron Foundry producing general castings. Must be well-experienced in gray iron molding to supervise molders doing machine, bench and floor work. Must be able to get along with men; set up patterns; take charge of cupola and coreroom, if necessary. Good opportunity for advancement. Substantial salary. Good living conditions. State age and experience. Address: Box 660, The FOUNDRY, Cleveland 13, Ohio.

PATTERN SHOP FOREMAN

EXPERIENCED PATTERNMAKER TO TAKE CHARGE OF NORTH EASTERN OHIO FOUNDRY PATTERNSHOP OF EIGHT MEN. MUST BE PROGRESSIVE AND FAMILIAR WITH ALL TYPES OF PRODUCTION EQUIPMENT. GIVE FULL DETAILS, QUALIFICATIONS AND PAST EXPERIENCE.

BOX 689
The FOUNDRY CLEVELAND 13, OHIO

FOUNDRY SUPERINTENDENT

Northwestern Ohio Company. To have overall supervision of two foundries—one gray iron and one malleable foundry. Some jobbing but mostly for manufacturing division of same plant. Must be experienced in all types of foundry work. Good opportunity with substantial salary for right man. Send full statement of qualifications for interview. Address: Box 596, The FOUNDRY, Cleveland 13, Ohio.

WANTED
AGENTS MANUFACTURER

Of a complete line of long wearing sand and shot blast nozzles desires agents in Continental U.S., Canada and Mexico to handle sales of products. Established 8 years.

BOX 561
THE FOUNDRY CLEVELAND 13, OHIO

ASSISTANT FOUNDRY SUPERINTENDENT

In large eastern plant manufacturing products in malleable, cast iron and bronze. Should have sound metallurgical training in the production of the above metals also in sand control and be a practical foundry man. Give age, education, experience, also salary expected. Address: Box 593, The FOUNDRY, Cleveland 13, Ohio.

MANAGER

To manage a Pattern Shop—must have a diversified knowledge of wood and metal machinery pattern. Address: Box 675, The FOUNDRY, Cleveland 13, Ohio.

Help Wanted

SUPERVISOR

To take charge of Inspecting, Grinding and Shipping Departments in malleable foundry. Write in detail, age, experience, when available and salary expected.

BOX 612
The FOUNDRY CLEVELAND 13, OHIO

PNEUMATIC TOOLS — FACTORY REPRESENTATIVES WITH SALES AND SERVICE ENGINEERING EXPERIENCE

Old established manufacturer of pneumatic tools, now with expanded line of products is desirous of obtaining Factory Representatives. Give complete record of experience. Address: Box 138, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY FOREMAN

Wanted for 50 molder Gray Iron Foundry in Ohio. Must know and have had practical and supervisory experience in production machine molding both cope and drag and squeezer. Must know all phases of foundry practice and cost saving methods. Full information including training, family status, education, experience, age, references must be given before interview is arranged. Address: Box 643, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY FOREMAN

Well established company operating gray iron production foundry in a small town in Northern Pennsylvania requires a foundry foreman. Interviews will be granted to applicants whose first letters give complete information as to age, family status, education, training, experience, when available and several business references. Address: Box 690, The FOUNDRY, Cleveland 13, Ohio.

BRASS FOUNDRY FOREMAN

A working foreman to assist Foundry Superintendent in a well equipped production brass foundry; good opportunity for a hustler. State age, experience and salary desired in first letter. Address: Box 192, The FOUNDRY, Cleveland 13, Ohio.

ASSISTANT TO FOUNDRY METALLURGIST

Young man with metallurgical training and one or more years' experience in gray iron foundry to act as assistant to foundry metallurgist on staff work. Sand control experience desirable. Midwest location. Address: Box 665, The FOUNDRY, Cleveland 13, Ohio.

GRAY IRON FOUNDRYMAN

Excellent opportunity in Mid-south for man experienced in continuous production foundry making internal pressure castings. State experience, education, age, etc. Address: Box 511, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY FOREMAN

To take charge of Grey Iron foundry producing machinery castings, employing 50 men. Must be experienced on molding machines, cupola practice and core room. Good opportunity for a hustler. Address: Box 549, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY ENGINEER

To operate modern continuous gray iron foundry in Kansas, 30 tons daily. We are a leading manufacturer in our field. Particulars furnished upon request. Good salary and future for right man. Address: Box 672, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY MANAGER

For Florida sand and permanent mold aluminum foundry. Must be experienced in production methods, know permanent mold design, metallurgy, etc. Compensation commensurate with results. Write full particulars in confidence. Address: Box 677, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY AND ENAMELING TECHNICIAN

An important Argentine plant employing over 200 wishes to contract a highly trained man in the manufacture of enameled cast iron bath tubs. Must have had long practical experience in molding, casting and enameling. State experience, qualifications and salary desired in first letter. Reply to: G. A. Casilla de Correo 18, Avellaneda (B.A.), Argentina.

Help Wanted

DISTRIBUTORS OR
FACTORY REPRESENTATIVES

INCREASE YOUR EARNINGS
RARE OPPORTUNITY

To represent progressive Mid-West manufacturer of quality steel blasting shot and grit, in various parts of the United States. Close factory cooperation, national advertising, field training, substantial commissions. For personal interview give phone.

BOX 602
The FOUNDRY CLEVELAND 13, OHIO

GRAY IRON PRODUCTION FOUNDRY SUPERINTENDENT

For a well established concern in central Ohio. Prime requisites—cupola practice, rigging, labor relations, and capable of low cost castings. Interview will only be given to those who in their replies give full information to include age, family status, education, training, experience and references. Address: Box 671, The FOUNDRY, Cleveland 13, Ohio.

PATTERN FOREMAN

Eastern steel foundry desires pattern foreman. One experienced in checking patterns, supervising shop, familiar with heading and gating for roll-over and squeeze machines. Excellent opportunity. Address: Box 667, The FOUNDRY, Cleveland 13, Ohio.

ASSISTANT TO MASTER MECHANIC

Young man, college graduate electrical engineering, to work as assistant to master mechanic in large steel foundry and machine shop located in Middle West. State salary wanted. Address: Box 647, The FOUNDRY, Cleveland 13, Ohio.

ASSISTANT FOUNDRY FOREMAN

Real opportunity for aggressive young man to supervise directly, molding and pouring of light gray iron castings. Ability to teach foundry practice essential. Company has operated successfully for a great many years and a steady position with future assured for the right applicant and salary expected. Address: Box 662, The FOUNDRY, Cleveland 13, Ohio.

PRACTICAL MOLDING FOREMAN

For small malleable iron foundry located in the East. Knowledge of metallurgy not necessary. Should be able to get production. Handle men. All long runs on aluminum plates. Good opportunity for the right man. When answering state qualifications, references, expected salary and when you will be available. Address: Box 683, The FOUNDRY, Cleveland 13, Ohio.

FOREMAN

For gray iron foundry pouring around 25 tons per day. Medium weight castings, floor and machine. Middle-west town, 75 thousand population. Must be experienced in production methods and general foundry and cupola practice. Write or wire: Box 652, The FOUNDRY, Cleveland 13, Ohio.

GRAY IRON FOUNDRY FOREMAN

We are in need of a man to take charge of our foundry, making light to medium weight jobbing castings. Capacity five to eight ton per day. Opportunity for capable man. Foundry located in Middle West, in good city. Address: Box 653, The FOUNDRY, Cleveland 13, Ohio.

ENGINEER

College engineering graduate, about twenty-four years old, preferably single with some foundry experience. Should have pleasant personality and be able to meet people. After training, would be used principally on sand service work and would be required as junior executive. Modest salary and expenses to start but excellent opportunity. Address: Box 650, The FOUNDRY, Cleveland 13, Ohio.

FOREMAN

EXPERIENCED MALLEABLE FOREMAN FOR MEDIUM AND HEAVY ROLLOVER WORK FOR EASTERN SECTION. ADDRESS: BOX 592, THE FOUNDRY, CLEVELAND 13, OHIO.

Classified Advertising

Help Wanted

SALES REPRESENTATIONS
For Mid-Western territories. Open, heat-corrosion resisting and stainless steel castings. Commission basis. Applicants must have experience. Address: Box 654, The FOUNDRY, Cleveland 13, Ohio.

FOREMAN
For Grey Iron Foundry. Plow and agricultural implement firm in Western New York between Buffalo and Rochester. State age, past experience and salary expected. Address: Box 656, The FOUNDRY, Cleveland 13, Ohio.

MOLDERS
Main floor molders for Mid-west foundry. Experienced in finishing and assembling molds. Address: Box 594, The FOUNDRY, Cleveland 13, Ohio.

EXPERIENCED PATTERN MAKER
For brass foundry located in Western Michigan. One acquainted with plumbers brass work. Give references and wages desired in first letter. Address: Box 625, The FOUNDRY, Cleveland 13, Ohio.

EXECUTIVE UNDERSTUDY
Graduate engineer, metallurgical or mechanical under 35 with some practical gray iron experience to enter large gray iron shop as understudy to foundry superintendent. Excellent opportunity. Address: Box 679, The FOUNDRY, Cleveland 13, Ohio.

WANTED
SALESMEN or MANUFACTURERS' AGENTS
Now calling on foundries and forgings companies to handle complete line of Missouri refractories. Write in detail giving territories now covered, products handled, qualifications, etc. Address: Sales Manager, Chicago Fire Brick Company, 1467 Elston Ave., Chicago 22, Ill.

FOREMAN
To assist Foundry Superintendent in large Eastern medium weight gray iron foundry. Must have practical knowledge of modern methods for rigging for production. State age, experience in detail. Address: Box 644, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY SUPERINTENDENT
Must be well experienced on both iron and bronze. Take full charge. Will pay salary plus liberal share of profits. Here is an opportunity for a man who knows his stuff and wants to share in the success of his efforts. Give full details of experience, education, etc. in reply. Address: Box 591, The FOUNDRY, Cleveland 13, Ohio.

BRASS FURNACE OPERATOR
Experienced secondary brass furnace operator. Address: Box 680, The FOUNDRY, Cleveland 13, Ohio.

SUPERINTENDENT OR FOREMAN
Must be experienced Jolt Squeezer Operator for light, grey iron production shop. Address: Box 691, The FOUNDRY, Cleveland 13, Ohio.

Positions Wanted

STEEL FOUNDRY SUPERINTENDENT
Metallurgical and chemical training at Sheffield University, England; twenty-three years' experience in the United States as metallurgist and superintendent in leading steel foundries. Three years as instructor in engineering school. Present position as chief metallurgist held for past 12 years; familiar with production methods, costs, labor relations. Member principal technical associations in metals field. Age 46, married, two children. Prefer opportunity in Middle Western area. Address: Box 659, The FOUNDRY, Cleveland 13, Ohio.

GENERAL MANAGER
MATURE, CAPABLE, DEPENDABLE
With a record that assures you that he can manage your business energetically and safely and develop its possibilities fully and profitably. Excellent experience foundry, machinery and allied lines. General management established medium-size business primary objective. Correspondence in confidence. Address: Box 598, The FOUNDRY, Cleveland 13, Ohio.

Positions Wanted

SUPERINTENDENT
OR
ASSISTANT
Graduate metallurgist, twenty-five years experience in production and research in ferrous, nonferrous, alloy and cast iron field. Well versed in latest technique molding, sand control and all furnace operations. Wide knowledge of both static and centrifugal castings. Address: Box 576, The FOUNDRY, Cleveland 13, Ohio.

CORE BINDER SPECIALIST
Five years' experience promoting core binder sales by laboratory research and technical service. Thorough knowledge of binders, sand problems, demonstration and evaluation methods. Will accept attractive laboratory or sales position. American, age 27, excellent references. Address: Box 685, The FOUNDRY, Cleveland 13, Ohio.

FOREMAN
OR
ASSISTANT
Experienced in core making, squeeze molding, pouring, grinding, sand blasting, chipping and inspection work on gray iron light and medium work. Prefer Central Michigan, Northern Indiana or Illinois. Address: Box 608, The FOUNDRY, Cleveland 13, Ohio.

SUPERINTENDENT OR FOUNDRY METALLURGIST
B.S. Metallurgical Engineer presently employed as Foundry Metallurgist and technical advisor in steel, gray iron, brass, bronze and aluminum foundry wants responsible position with progressive company desiring technical control and supervision. Experienced in all phases of casting manufacture. Address: Box 640, The FOUNDRY, Cleveland 13, Ohio.

GRAY IRON FOUNDRYMAN
Broad foundry and management experience capable of directing operations efficiently and profitably. A practical executive with qualified record for maintaining good customer and personnel relations and working out foundry problems promptly and effectively. Address: Box 668, The FOUNDRY, Cleveland 13, Ohio.

ACID ELECTRIC STEEL MELTER
Twenty-five years' experience on carbon and alloy steels. Qualified to take complete charge of melting, ladles and pouring. Available at once. Best of references. Address: Box 610, The FOUNDRY, Cleveland 13, Ohio.

BRASS FOUNDRY FOREMAN
Practical experience on high grade work including chandelier castings, grave markers, ornamental bronze, hardware, steam valves, jobbing and production work. Prefer position with manufacturing plant. Address: Box 472, The FOUNDRY, Cleveland 13, Ohio.

SALESMAN
Retired foundryman. Good health. Fifteen years' selling sand, 25 years selling specialty binders. Address: Box 648, The FOUNDRY, Cleveland 13, Ohio.

PRACTICAL FOUNDRYMAN
With twenty years as assistant foundry superintendent on electrical steel, open hearth steel, gray iron and semi-steel. Know floor, pit and machine molding for production. At present assistant foundry superintendent. Age 56. Married. References if desired. Address: Box 642, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY FOREMAN
OR
SUPERINTENDENT
Brass, aluminum or steel. Practical coremaker, molder and melter. Good rigger and get along well with all types of labor. Address: Box 586, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY MAN
College graduate, twenty years' experience in a supervisory and technical capacity as superintendent, chemist-metallurgist, foreman heat treating and cleaning room. Experienced in cupola and Electric furnace operation. Knows foundry sands for light, medium and heavy work. Desires connections with a reliable steel or gray iron foundry. Mid-west preferred. Address: Box 684, The FOUNDRY, Cleveland 13, Ohio.

Positions Wanted

FOUNDRY EXECUTIVE
Excellent background of 15 years' experience in foundry work from blueprint through delivery. Iron, electric furnace steels, all nonferrous metals. Production schedules, labor-management relations. Personable, enterprising, 37 years of age, married. Address: Box 645, The FOUNDRY, Cleveland 13, Ohio.

JUNIOR METALLURGIST
Discharged veteran, 25 years of age, B.S. degree in Metallurgy. One year practical experience in gray iron production. Desires position with opportunity for advancement. Address: Box 649, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY SUPERINTENDENT
Wide experience, 24 years in full charge of foundries. Practical molder and core maker. Medium and heavy high grade machinery and jobbing castings, gray iron and semi-steel, green and dry sand. Well versed in metallurgy. Address: Box 550, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY SUPERINTENDENT
Available soon desires to make a change. Practical foundryman from molder to presently employed as plant superintendent. Years' experience on stoveplate, gas burners and light gray iron castings. Know how to rig patterns on matchplates. Qualified to take complete charge of plant from buying to selling. Prefer Eastern Pennsylvania. Address: Box 676, THE FOUNDRY, Cleveland 13, Ohio.

SUPERINTENDENT (BRASS-GRAY IRON)
Am interested in connection with jobbing or small production foundry employing 12-15 molders where my 30 years' experience in brass and iron are needed. Middle West. Address: Box 688, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY EXECUTIVE
Thoroughly qualified foundry executive desires to make connection with organization operating iron and/or bronze foundry. Familiar with production and jobbing castings. At present employed, available in sixty days. Address: Box 670, The FOUNDRY, Cleveland 13, Ohio.

ALUMINUM PERMANENT MOLD
Metallurgical engineering graduate with extensive experience in all phases of production desires new connection. Address: Box 661, The FOUNDRY, Cleveland 13, Ohio.

ELECTROFORMED IRON INSERTS
Consultant in electroforming of iron offers his professional services to foundries specializing in cast iron molds for the glass industry. Designer and organizer of iron electroforming Departments. Address: Box 666, The FOUNDRY, Cleveland 13, Ohio.

ALUMINUM FOUNDRY SUPERINTENDENT
Thirty years practical experience. Now employed, desires change. Address: Box 673, The FOUNDRY, Cleveland 13, Ohio.

GRAY IRON FOUNDRY SUPERINTENDENT
Young gray iron foundryman. Not a college man. Eighteen years' practical experience in all phases of foundry operation. Employed as foundry superintendent for past seven years. Available at once. Address: Box 614, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY METALLURGIST
College graduate with ten years' steelmaking experience in foundry and steel mill, acid and basic melting in electric arc furnaces and induction furnaces. Address: Box 692, The FOUNDRY, Cleveland 13, Ohio.

SALESMAN
With following wants connection with foundry interested in selling white iron. Have complete information on manufacture. Address: Box 623, The FOUNDRY, Cleveland 13, Ohio.

GENERAL FOREMAN OR SUPERINTENDENT
A practically trained foundryman, well versed in all phases of production and jobbing work, steel and high alloy. Twelve years' experience with both small and large castings. Presently employed as superintendent by Midwest Manufacturer but desire to make a change. An engineering graduate, capable of handling any foundry assignment. Address: Box 629, The FOUNDRY, Cleveland 13, Ohio.

Classified Advertising

Open Capacity

OPEN CAPACITY
2000 pounds daily. Aluminum 10 castings pounds and under. Send samples or prints for quotations. FORT LAUDERDALE FOUNDRY, INC., FORT LAUDERDALE, FLA.

GRAY IRON CAPACITY
We have capacity available for gray iron castings, semi-production and production type. Prefer work such as pressure castings made to rigid requirements and controlled specifications.
BAY CITY FOUNDRY
BAY CITY, MICHIGAN

OPEN CAPACITY
Our foundry has open capacity for sand cast small and medium size aluminum castings. Address: Mowrey Foundry Co., 1221 Elm St., Ashland, Ohio.

Open Capacity

CAPACITY AVAILABLE
Gray Iron Foundry located in Northern Ohio has capacity for certain types of cope and drag rollover work. Castings ranging from 50 to 150 lbs.—either gray iron or semi-steel. Orders must be in lots of from 200 to 1,000. Address: Box 687, The FOUNDRY, Cleveland 13, Ohio.

Correspondence Course

THE CUPOLA IS THE HEART OF THE FOUNDRY

Turn the searchlight of McLain's System on your cupola. 90c of every dollar is spent before melting begins—but some make it look like 30c by indifferent melting. Are you using the maximum percentage of steel scrap in your castings? If not, why not? The value of the scrap pile lies in the fact it offers you food for thought. Our system is worth the fee as a desk reference. Synopsis free.

McLAIN'S SYSTEM INC.
236 E. NORTH AVE., MILWAUKEE 12, WIS.

Opportunities

TO FOUNDRIES AND MANUFACTURERS
We are ready to offer our services as foundry and manufacturing representative engineers dealing in castings, forgings, die castings, stampings, fabricating and precision machined piece parts. Our past experience and contacts offer you immediate and competent service.
J. F. NOLAN and J. B. WEINGARTNER
THE TRIDEN COMPANY
549 W. WASHINGTON BLVD.
CHICAGO 6, ILL.

OPPORTUNITIES
Aluminum Foundry will sell part interest to individual qualified to assume full management. Good facilities, ample labor, large orders. Write, giving qualifications and financial position. All replies confidential. Address: Box 678, The FOUNDRY, Cleveland 13, Ohio.

EXPORT REPRESENTATION
American mfr. of quality steel cleaning and peening shot and grit wants foreign trade. Big stocks. Ask for literature and samples. Advise lines now selling, territory covering.
BOX 617
The FOUNDRY CLEVELAND 13, OHIO

OPPORTUNITY
We can furnish empty tight and slack wooden barrels also steel drums for your products. ADDRESS: BUCKEYE COOPERAGE STATION, C.P.O. BOX 1501, CLEVELAND, OHIO.

Opportunities

WANTED
SOURCE FOR SMALL GRAY IRON CASTINGS. (ONE 8 LBS. AND ONE 3 LBS.) PAINTED WRINKLE FINISH. SOME DRILLING, TAPPING AND ASSEMBLY. STEADY YEAR-AROUND BUSINESS. SUBSTANTIAL QUANTITIES. SAMPLES AND FULL DETAILS SUBMITTED. ADDRESS: BOX 669, THE FOUNDRY. CLEVELAND 13, OHIO.

OPPORTUNITY
We manufacture Mill Stars. Address: Box 682, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY EQUIPMENT LINES WANTED
Aggressive Los Angeles firm with established markets desires high-grade lines of ferrous and nonferrous foundry equipment. Energetic and well known representation travelling Southern California and Central California points. Address: Box 651, The FOUNDRY, Cleveland 13, Ohio.

Capacity Wanted

WANTED
Foundry to make small gray iron castings. Can give contract for 350 to 500 ton first year. Pattern plates furnished. Address: C. G. S., P. O. Box 31, Oconto, Wis.

Wanted-To-Buy

WANTED

Cupola blower to supply 3500 CFM against 20 oz. pressure for No. 6 Whiting.

Sand Muller: 3½-4 Cubic Feet.

Wire Straightener: Sizes #13-#14-#15.

BOX 674
THE FOUNDRY CLEVELAND 13, OHIO

WANTED
SMALL CAST IRON FOUNDRY
To buy or rent with option to buy. Located in Illinois, Wisconsin or Indiana. Address: Box 616, The FOUNDRY, Cleveland 13, Ohio.

SAND MULLER WANTED
7 to 15 Cu. Ft. Capacity
Please describe fully: make, age, condition, accessories, electrical equipment, price. Address: Box 655, The FOUNDRY, Cleveland 13, Ohio.

MACHINERY WANTED

One No. 275 P.J. 16 x 20 Osborn Molding Machine or equal.

AUGUST SPINDLER & SONS CO.
243 MERCER STREET
JERSEY CITY, N. J.
BERGEN 3-4048

WANTED
American Gasoline Sand Cutter same as or similar to Model AA712, size 62". Inside width of wheels, rim to rim 65", outside width 72". Overall width not more than 7' 5", cutting wheel 52". Address: **SANITARY CO. OF AMERICA, LINFIELD, PA.**

WANTED — FOUNDRY TO RENT OR BUY
Small gray iron foundry, preferably equipped, in Middle West. Give full particulars. Address: Box 657, The FOUNDRY, Cleveland 13, Ohio.

MIXERS WANTED
Used Simpson Intensive Sand Mixers. State size, condition and lowest cash price for immediate acceptance. Address Box 578, The FOUNDRY, Cleveland 13, Ohio.

Employment Service

SALARIED POSITIONS
$2,500-$25,000
This thoroughly organized confidential service of 36 years' recognized standing and reputation carries on preliminary negotiations for supervisory, technical and executive positions of the calibre indicated. Retaining fee protected by refund provision. Identity covered and present position protected. Send only name and address for details.
R. W. BIXBY, INC.
101 Dun Bldg. Buffalo 2, N. Y.

GRAY IRON FOUNDRY EMPLOYMENT
We are receiving many inquiries for superintendents, metallurgists and foremen. We shall be glad to hear from qualified men. No charge.
Gray Iron Founders' Society Inc.
1010 Public Square Building Cleveland, Ohio

For Sale

FOR SALE

1—Ransohoff Water Mill 36 x 60 side loading and end loading. Automatic star separation and star return. Complete with direct drive and in good condition.

1—Plain jolt machine 20 x 30 table.

1—Cylindrical-covered ladle (geared) 29" x 28½" (Modern) 1500 lbs. capacity.

1—405 Osborn Jolt Roll-over pattern draw; jolt cylinder 12" dia. Pattern draw 18" max. flask limit 64".

1—46" dia. x 56" inside length tumbling barrels.

2—30" dia. x 42" inside length tumbling barrels.

BOX 635
The FOUNDRY CLEVELAND 13, OHIO

4 SPENCER TURBO COMPRESSORS FOR FOUNDRY CUPOLA

Available for immediate delivery subject to prior sale.

DESCRIPTION

Three units—16" outlet, 16" inlet, 4800 cpm at 2 oz. pressure, 40 hp Westinghouse Motor, 220/440 v, 3 ph, 60 cy, 3540 rpm.

One Unit—12" outlet, 15" inlet, 3000 cpm at 20 oz. pressure, 25 hp Westinghouse Motor, 220/440 v, 3 ph, 60 cy, 3540 rpm.

Write, wire, phone

CONDENSER SERVICE & ENGINEERING CO., INC.
95 RIVER STREET, HOBOKEN, N. J.

FOR SALE

1 #918-B Johnston & Jennings Jolt Rollover Pattern Draw Molding Machine with automatic adjustable rollout conveyor specifications:

Table size 44" x 54" Patt. draw 20" capacity (80# air pressure) 2000# dia. jolt cylinder 9" dia. rollover cylinder 12" dia. clamp & draw cylinder 8" max. Ht. Flask, pattern and bottom board 47" Ser. No. 2790.

In original crate. Never been used. Immediate delivery.

LAKESIDE MALLEABLE CASTINGS CO.
RACINE, WIS.

FOR SALE
Roots Connersville No. 4 positive pressure cupola blower and 20 H.P., 230 V.—D. C.—G. E. Motor. Will sell separately or together. Blower has displacement of 13.1 cubic feet per revolution, normal operating speed 285 R.P.M. gear drive. Both motor and blower in good condition.
SHERIDAN IRON WORKS
CHAMPLAIN, NEW YORK

Classified Advertising

For Sale

OVERHEAD CRANES

1-Ton
Whiting 33′ Span
Curtis 24′ Span
1½-Ton
Shepard Niles 25′6″ Span
P & H 34′ Span
2-Ton
Louden 19′2″ Span
Box 36′9″ Span
Detroit 28′ Span
3-Ton
Shaw 33′ Span
P & H 25′ Span
Northern 22′ Span
Manning, Maxwell & Moore 48′¾″
"Conco" 48′ and 36′6″ Spans
5-Ton
Whiting 47′4″ Span
38′10½″ Span D.C.
Northern 30′9″ Span
Milwaukee 70′ Span
Milwaukee 66′9″ Span
Manning, Maxwell & Moore 70′ Span
Manning, Maxwell & Moore 47′4″ Span
Shaw 36′ Span
Champion 37′6″ Span
American 70′ Span
American 47′4″ Span
6-Ton
P & H 77′ Span
American 77′ Span
7½-Ton
Shepard 36′ Span
10-Ton
Shaw 68′ Span
Shaw 73′ Span
P & H 30′ Span
P & H 87′6″ Span
P & H 80′ Span
Northern 71′10½″ Span
Northern 60′ Span
Morgan 55′6″ Span
Morgan 39′5″ Span
Morgan 52′3″ Span
Milwaukee 66′9″ Span
McGill 85′ Span
Lane 50′ Span
Emsco 75′ Span
Dominion 35′ Span
Cleveland 38′1½″ Span
Cleveland 50′ Span
Alliance 71′10½″ Span
Alliance 58′9″ Span
Albany 60′ Span
15-Ton
Whiting 71′10½″ Span
Northern 53′ Span
Erie 60′ Span
Chesapeake 55′6″ Span
Case 51′ Span
20-Ton
Shepard Niles 49′6″ Span
P & H 51′4″ Span
Northern 60′ Span
Morgan 60′ Span
Cleveland 65′ Span
25-Ton
Whiting 106′ Span
Tysaman 60′ Span
P & H 70′ Span
Morgan 52′3″ Span
Cleveland 106′ Span
Case 63′ Span
Bedford 50′ Span
30-Ton
Whiting 80′ Span
P & H 80′ Span
P & H 60′ Span
Morgan 30′ Span
Case 41′ Span
35-Ton
Bedford 50′ Span
Northern 22′ Span
50-Ton
Shaw 95′ Span
Shaw 69′10″ Span
Dominion 80′ Span
Cleveland 71′10½″ Span
75-Ton
Morgan 59′2½″ Span
Alliance 78′ Span
Alliance 37′ Span
80-Ton
American 40′6″ Span
125-Ton
Morgan 100′ Span
150-Ton
Whiting 30′ Span
175-Ton
Morgan 54′ Span
200-Ton
Alliance 100′ Span

Telephone us collect to discuss your requirements.

ECONOMY CO., INC.
49 VANDERBILT AVENUE, NEW YORK 17, N. Y.
Telephones: MUrrayhill 4-2294, 4-2893, 4-2295, 4-2844, 4-2296, 4-8292

MOLDING MACHINES

International Draw Type GJ Hand Ram Power Roll-over Foot Draw.
May be inspected at

UNITED STATES ALUMINUM CO., PURCHASING DEPARTMENT, FAIRFIELD, CONN.
14-22″ x 8″ Price—$299.00 each.

Mail all offers to purchase to: W. J. LOEFFLER, ALUMINUM CO. OF AMERICA, GULF BLDG., PITTSBURGH 19, PA.

FOR SALE

Molding Machine
49″ x 96″ Table
with 16″ pattern draw
International Type F
Roll-over Jolt
Used only 6 months.

WAYNE FOUNDRY CO.
DETROIT 10, MICH.
TEL. LAFAYETTE 8226

FOR SALE

1—Adams Cherry Slip Flask 16½″ x 22½″, Cope 4″, Drag 6″—Tapered 5 degrees $30.00
6—Adams Steel Jackets, 16½″ x 22½″, 7½″ Deep ..... $9.10 ea.
1—Adams Cherry Slip Flask, 13 x 22, Cope 5½, Drag 4″, Tapered 5 degrees $28.00
F.O.B. Edwardsville, Illinois. New equipment, can make immediate delivery.

BOX 646
The FOUNDRY CLEVELAND 13, OHIO

FOR SALE

Johnston and Jennings moulding machine, jolt, squeeze and roll-over, table size 30″ x 40″. Machine has never been used. Machine number 815. Address: EAGLE MFG. CO., APPLETON, WISCONSIN.

FOR SALE

1—Modern 3 ton cylindrical ladle mounted on 4 wheel car—good condition.

6—J-275 Osborn squeezers.

BOX 664
The FOUNDRY CLEVELAND 13, OHIO

FOR SALE

1—American Foundry Equipment sandcutter, 220/440 volt, 3 phase, 60 cycle, Model 69/45. This item was purchased new in 1945.

WM. R. THROPP & SONS CO.
968 E. STATE ST.
TRENTON, N. J.

FOR SALE

1—24″ Walker Cupola 1 ton per hour capacity.
1—SPO No. 413A Jolt Rockover Squeezer molding machine.
1—SPO No. 213C portable Jolt Squeezer, stripper or push up molding machine and other molding machine items.

BOX 653
The FOUNDRY CLEVELAND 13, OHIO

FOR SALE

Two cupola spark and flame suppressors for #4 Whiting cupolas. Shell diameter 56″. Good condition. Never used.

THE SYMINGTON GOULD CORPORATION
DEPEW, NEW YORK
A. R. McHENRY

REBUILT EQUIPMENT

Molding machines, all types; tumbling mills; furnaces; cupolas; air compressors; hoists; rammers, all types; ladles, all types; sand mixers; sand blast tanks; core machines, etc. All equipment rebuilt and guaranteed. All sizes used steel flasks.

HAYNES FOUNDRY EQUIPMENT COMPANY
1734 LAKE ST. KALAMAZOO 21, MICH.

FOR SALE

Brass foundry, general jobbing, vicinity of Philadelphia, Pa. Sales from $85,000 to $90,000 a year with plenty of orders. Owner wishes to retire. Address: Box 641, The FOUNDRY, Cleveland 13, Ohio.

For Sale

FOR SALE
ONE ROOTS CUPOLA BLOWER

Used. In excellent condition, not used since rebuilt. Serial #R7B11, 24 oz pressure, 6500 cu. ft. air per minute. Impeller type. $1500.

NATIONAL FOUNDRY CO. of NEW YORK
10 Sandford St., Brooklyn, N. Y.

REBUILT
BLOWERS—FANS—EXHAUSTERS

Centrifugal blowers for gas and oil burning Sand blast, grinders and dust exhausters Roots-Connersville positive cupola blowers Welding fume exhausters—Ventilating fans.

GENERAL BLOWER CO.
8601 FERRIS AVE.
MORTON GROVE, ILL.

FOR SALE

Several 17 x 17 x 9 x 9 Hines heavy duty pop-off flasks—10 jackets.
1—14 x 50 x 3 x 4¾—Hines heavy duty Dow metal flask—2 jackets.
Several smaller sizes. Write for list.

KENCROFT MALLEABLE CO., INC.
373 HERTEL AVENUE
BUFFALO 7, N. Y.

FOR SALE

Model 48A Davenport jolt rollover draw molding machine, capacity—6,000 pounds, table size —48″ x 82″. Only slightly used and guaranteed like new. Bargain.

THE FRANCIS & NYGREN FOUNDRY CO.
2542 FILLMORE ST., CHICAGO 12, ILL.

FOR SALE

#1 American tablast complete with dust arrestor new piping, 220, 440V, 2 Ph, 60 cycle. 6, 15″ tables or 12 8″ tables many extra repair parts priced $2500—complete F.O.B. our plant. Address: HILLSDALE FOUNDRY CO., HILLSDALE, MICHIGAN.

FOR SALE

1—Whiting No. 10 cupola, serial No. 4893, complete with stack, water jackets, wishbone and three charging buckets, size 48″ diameter x 48″ high.
1—Three-ton No. 3894 Whiting charging trolley.
1—Allis-Chalmers 4″ x 3″ SK water pump with 20 HP type ARX motor.

NATIONAL MALLEABLE AND STEEL CASTINGS CO.
546 NORTH HOLMES AVE.
INDIANAPOLIS 6, IND.

FOR SALE

Two Whiting bottom drop electric furnace charging buckets, 99 cubic feet capacity, diameter 54″, depth 75″ with Sivyer trip lever arrangement. Address: Symington-Gould Corp., Depew, New York.

FOR SALE

Tumbling Mills. W. W. Sly Make. Exhaust type. Heavy duty. Friction cluch. Gear Drive. Good Condition.

3—48″ by 28″ x 28″ square.
1—60″ by 36″ x 36″ square.
2—Cast Iron Octagon Mills 56″ x 24″ inside. Ball Bearings. Built 1940.
1—42″ x 16″ x 16″ square Mill Ball Bearing.
2—Light Weight Barrels. 42″ high, 26″ wide for Aluminum and light work.

JAY SALTER
306 ROSEDALE STREET
ROCHESTER 7, N. Y.
MONROE 8075

Classified Advertising

For Sale

REBUILT EQUIPMENT IN STOCK

Molding Machines

2—International Type F 24" x 10" Stationary Power Jolt, Rollover, and 10" draw.
1—International Type M 24" x 10" Portable Power Jolt, Hand Rollover and Draw.
1—Osborn No. 450 Stationary Jolt Stripper.
3—Arcade Modern No. 2-38 Portable or Stationary Hand operated Squeeze Rollover Draw with swing out table.
5—Mumford 3" cyl. Core Jolt with 20" x 15" table.

Metal Melting Equipment

New 32" to 41" dia. shell cupolas made to order.
1—Monarch Tilting Iron Pot Aluminum Furnace 100 lbs. cap. Gas or Oil.
2—Hausfeld Tilting Crucible Aluminum Furnaces 33" dia. shell. Gas or Oil.
2—Hausfeld Open Flame Tilting Brass Furnaces 400 lbs. cap. Gas or Oil.
2—Monarch-Rockwell Rotating 500 lbs. brass. Oil.

Blowers for Cupolas and Furnaces

Maxon-Premix Blower Sets for Gas ⅛ to 1 H.P. Motor Driven Centrifugal blowers to 2 lbs. press. Belt Driven Centrifugal blowers for Cupolas.

Tumbling Mills and Sand Blast

1—Sly 48" dia. x 60" long, round tumbling mill. Single pulley drive.
1—24" dia. x 30" long light duty horizontal tumbling mill with 3 HP motor mounted and belted.
3—Portable Sand Blast generator tanks 500 lbs. sand capacity.
1—173 Safety speed-rite double end snagging grinder 24 x 3 wheel motorized 15 horsepower AC V belt driven.

Air Compressors 1 to 60 H.P.

CLIFTON MACHINERY CO.
1023 W. 6th ST. CINCINNATI 3, OHIO
PHONE PARKWAY 7812

FOR SALE

Pangborn Cleaning Units (Shot Blast), Type ES-141, Cabinets, Conveyor, Separator, Buckets, Rotoblast Units, Motor driven scalping Wheel and Motors like new. Metal Wash Unit never used. Address: H. Loeb & Son, 4643 Lancaster Ave., Philadelphia 31, Pa.

FOR SALE

One Pittsburgh Electromelt Furnace, Type 5, Size ST, with Transformer and Motor Generator, complete. This equipment has only been in operation one year. Address: Box 686, The FOUNDRY, Cleveland 13, Ohio.

FOR SALE

1—Herman Pneumatic Machine Company Serial No. 360. 60" x 84" independent turn over and pattern drawing device with 60" x 80" jarring molding machine. Bumper type. Machine used less than ten years. Inspection at plant of Kewanee Boiler Corp., Kewanee, Illinois.

FOR SALE

400 steel cast flasks. Size 12 x 18 inches. Heavily enforced, all pins and bushings machined. All flasks 3 inches deep. Address: Box 681, The FOUNDRY, Cleveland 13, Ohio.

FOR SALE

1—#2½ Whiting Model B Cupola. Complete with Motor Driven Blower. Address: Box 663, The FOUNDRY, Cleveland 13, Ohio.

MOLDING MACHINE

Johnston and Jennings Jolt Pin Lift—6000 lbs. capacity—Pins adjustable from 24" to 53", 30" x 36" table—In good condition, used only three months. If interested write or call INDIANAPOLIS BRASS & ALUMINUM FOUNDRY, INDIANAPOLIS, INDIANA, FRANKLIN 3437.

FOR SALE

16 Fisher tilting and stationary melt furnaces; 14 Lindberg gas and electric furnaces, all new in 1942; sandblast equipment, complete core oven 7' x 10' x 16?', sand storage bin in five sections 6350 tons capacity, conveyors, miscellaneous other foundry equipment. Address: Max Zeigler & Bros., Muncie, Ind.

FOR SALE

1—#918 Johnston & Jennings Air Jolt Roll Over Moulding Machine in good condition. Address: D. R. Sperry & Company, Batavia, Ill.

FOR SALE

A well-equipped brass and gray iron foundry. Location Northwestern Ohio. Address: Box 468, The FOUNDRY, Cleveland 13, Ohio.

For Sale

MOLDING MACHINES

Osborn Hand Ram Power Roll-over Hand Draw Precision Built.

26—No. 2042 machines available immediately. All machines were new 1942 and are in good operating condition now. Similar Osborne Model 2042-1 except have hand draw. Prints are available.

Your offers should be sent to ALUMINUM COMPANY OF AMERICA, c/o MR. W. J. LOEFFLER, GULF BLDG., PITTSBURGH 19, PA. Inspection may be made at the UNITED STATES ALUMINUM CO., PURCHASING DEPT., FAIRFIELD, CONN.

FOR SALE

1—Nicholls type "D" Molding Machine 14-36, at $380.00—F.O.B. Buffalo, New York.
1—Whiting Corp. #30 Air Separation Coal Pulverizer, complete with screw feeder, latest type with split housing and roller plates. Mounted for 25 to 60 cycle. Brand new, still in original crate. Also 60 cycle used motor and starter for above. Address: KENCROFT MALLEABLE CO., INC., 373 HERTEL AVE., BUFFALO, N. Y.

CENTRIFUGAL COMPRESSORS AND BLOWERS

2100 CFM GE with 10 HP 3/60/3450 RPM motor.
1200 CFM Buffalo, 9½ x 7 x 7¼ with 7½ HP, 220/3/60 1750 motor.
20¼ x 16¼ x 18¼ Allington and Curtis No. 55 (belt drive).
10½ x 10½ American size 5, (belt drive).
(2) 8 x 8 Sturtevant size 21061-9 (belt drive).

THE MOTOR REPAIR & MFG. CO.
1552 HAMILTON AVE., CLEVELAND 14, OHIO

POSITION WANTED

Minimum advertisement set solid, 30 words $1.50. Additional words 5c each.

HELP WANTED

Minimum advertisement set solid, 30 words or less $3.00. Additional words 10c each.

FOR SALE

Minimum advertisement set solid, 30 words or less $3.00. Additional words 10c each.

WANTED

Minimum advertisement set solid, 30 words or less $3.00. Additional words 10c each.

Miscellaneous advertisements such as "Personals", "Services" etc., minimum 30 words set solid, $3.00. Additional words 10c each.

Forms close 13th of month preceding issue

Note: If replies are to be sent to a box number in care of The FOUNDRY, add 6 words to your advertisement for box number and address.

Any advertisement set in all caps, add 50% to above rates.

For Sale

OVERHEAD ELECTRIC TRAVELING CRANES

	Tons	Make	Span	Current
(1)	5	Northern	30'9"	220-VAC.
(1)	5	P & H	35'0"	220-VAC.
(1)	8	Toledo	51'6"	230-VDC.
(2)	10	P & H	35'0"	230-VDC.
(2)	10/5	P & H	80'0"	230-VDC.
(2)	10	P & H	80'0"	230-VDC.
(1—10-ton & 1—5-ton trolleys on each crane)				
(1)	20	Cleveland	50'0"	230-VDC.
(1)	30/10	Whiting	80'0"	230-VDC.

(1)—15-ton Shaw 106'8" span, 230-VDC., CG. OP. 36' lift, will furnish REBUILT for outdoor or indoor service.
(1)—3-ton Chesapeake Gantry, 3-motor, CG. OP., or FL. OP. 220/440-VAC. 18'11" between legs, 5'6" overhang each end.
Add to McCABE ADD .. ..

MONORAIL ELECTRIC HOISTS

Tons	Make	Current	Remarks
1	½ Lo-Hed	220-VAC.	Fl. Op.
3	½ Shepard	230-VDC.	2-motors
1	1 Harrington	A.C. or D.C.	Fl. Op.
1	1 Euclid	110-VDC.	Fl. Op.
4	1 Shepard	230-VDC.	Fl. Op.
1	2 Link-Belt	220-VAC.	Geared Troll.
2	2 Shepard	110-VDC.	Fl. Op.
1	2 Shepard	230-VDC.	Fl. Op.
1	3 Shepard	230-VDC.	Geared Troll
1	5 Shepard	230-VDC.	2-motors
1	7½ Shepard	230-VDC.	2-motors

(Cg. Op. 40'0" Lift, Hoist 25/75-FPM., trolley 400-FPM.)

230-VDC. CRANE & MILL MOTORS SERIES

	H.P.	Make	Type	R.P.M.
1	2½	G.E.	C.O.-1803 (Comp.)	650
1	5	Westghse	HK-2	850
1	6	G.E.	C.O.-1805	1150
2	6¼	Westghse	K-3	680
1	7½	Westghse	K-4	750
1	7½	G.E.	C.O.-1804	725
1	7/10	G.E.	MD-102 (Back Axle)	1025/800
1	9	G.E.	MD-102 (Back Axle)	975
1	12	G.E.	MD-103	875
1	15	Westghse	HK-5	700
2	15	Westghse	K-6	550
2	11/19	C.W.	B.W. (Back Axle)	675/560
2	30/45	G.E.	MD-104½ (Compd.)	625/500
1	35	G.E.	C.O. 1810	500
1	30/45	C.W.	Size D.W.	620/520
2	12½	Westghse	K-8	910
1	50	G.E.	MD-105	475
2	52	Westghse	K-10 (Back Axle)	740
2	54/80	C.W.	Size F.W.	575/480
1	150	Westghse	RNY-96 (Comp.)	550

Send for our stock list covering 230-VDC. single and variable speed motors, 220/440-VAC. std and slip ring motors, crane controllers and electric brakes. 1 to 1200-HP. M G. Sets, etc.

SPECIAL:

1—3-ton Chesapeake 3-motor, Cg. Op., 220/440-VAC. Gantry Crane, 18'11" bet. legs, 15'6" overhang each end, REBUILT.
1—Simpson No. 2 Sand Mixer, two mullers, high side, with loading device and extra muller tires.

WE OWN AND HAVE ALL THIS EQUIPMENT IN STOCK. IT IS OFFERED REBUILT IN OUR LARGE, MODERN PLANT AND FULLY GUARANTEED.

T. B. MACCABE CO.
4304 CLARISSA ST.
PHILADELPHIA 40, PA.

FOR SALE
FOUNDRY CUPOLA

Outside diameter at base, 7'6".
Height from base to charging door, 16'.
Diameter of melting chamber, 5'.
Charging door, 27" x 36", 2 tap holes at 180°.
Cupola set on 4 iron legs 3' high.
Manufactured by The W. W. Sly Mfg. Co., Cleveland, Ohio.
No. 72 Cupola.

BLOWER

Manufactured by Sturtevant Gas Blower Type Des. 4.
Size 8, number 54690, Fan chamber 18" x 38" diameter x 18".
Outlet—no motor.

CONDENSER SERVICE & ENGINEERING CO., INC.
95 RIVER STREET, HOBOKEN, N. J.

VELSICOL

light-color

CORESIN OILS

FOUNDRYMEN *were impressed . . .*

• • • with the extraordinarily high dollar-value offered by CORESIN OILS, measured by their economical use in the sand mix, by greater efficiency in foundry operations, and by increased tonnage of finished castings, all the result of CORESIN OILS' unvarying uniformity. The record breaking response to CORESIN OILS at the A.F.A. Show was gratifying. A trial test of VELSICOL CORESIN OIL in your foundry will impress you, too, with these outstanding properties:

1 **Imparts high, fast tensile strength to cores.**

2 **Assures ample, properly timed collapsibility.**

3 **Cuts gas and smoke to a minimum.**

4 **Produces cores that come out clean and shake out readily.**

5 **Unvarying uniformity due to production control of essential resin ingredient.**

6 **Works well in sand blowing machines.**

7 **Greater dollar-value.**

Write us, or the representative nearest you stating your sand and baking conditions, and a generous sample of the proper VELSICOL CORESIN OIL will be sent without charge for you to test.

VELSICOL Corporation

Manufacturers of Coresin Core Oils • Aromatic Solvents • Synthetic Resins • Insecticides

General Offices: 120 East Pearson Street • Chicago 11, Illinois

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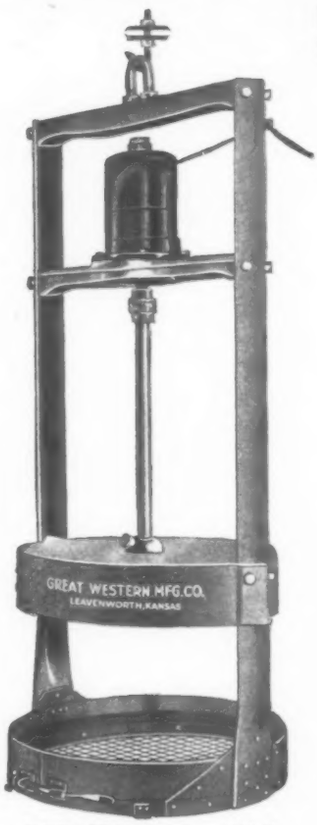
Combs GYRATORY FOUNDRY RIDDLES

Do you remember seeing these machines at the Foundry Show in Cleveland, in booth 1509?

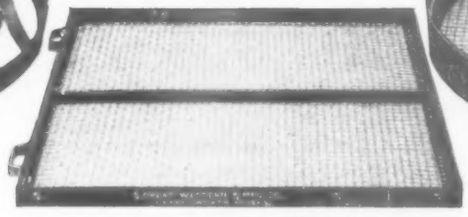


TYPE "CR" . . . 24" dia.

TYPE "V" . . . . . 20" dia.
TYPE "V-5" . . . 36" dia.

TYPE "CS" . . 24" square

STEEL RIM & BOTTOM
For Type "V" . . . 20" Dia.
For Type "V-5" . . 36" Dia.



STEEL RIM & BOTTOM
For Type "CS" . 24" Square

STEEL RIM & BOTTOM
For Type "CR" . . . 24" Dia.

SIEVE BOTTOMS

Made of VERY HEAVY galvanized wire
Order by Gauges Specified

TYPE "V" 20" Dia.		TYPE "V-5" 36" Dia.		TYPE "CR" 24" Dia.		TYPE "CS" 24" Square	
Mesh	Gauge Wire	Mesh	Gauge Wire	Mesh	Gauge Wire	Mesh	Gauge Wire
2	14	2	14	2	14	2	14
3	16	3	16	3	16	3	16
3½	18	3½	18	3½	18	3½	18
4	18	4	18	4	18	4	18
5	20	5	20	5	20	5	20
6	20	6	20	6	20	6	20
8	20	8	20	8	20	8	20
STEEL RIMS Type "V" 20" Dia.		**STEEL RIMS** Type "V-5" 36" Dia.		**STEEL RIMS** Type "CR" 24" Dia.		**STEEL RIMS** Type "CS" 24" sq.	

GREAT WESTERN MFG. CO. NOT INC.

LEAVENWORTH, KANSAS

MODERN EQUIPMENT COMPANY

MODERN HAND POWER CRANES
MODERN ELECTRIC CRANES
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MODERN EQUIPMENT CO

METAL POURING DEVICES
HOT METAL DISTRIBUTING SYSTEMS
CUPOLAS AND CUPOLA CHARGERS

PORT WASHINGTON
WISCONSIN

TO OUR MANY FRIENDS IN THE FOUNDRY INDUSTRY:

We thank you for your interest and the opportunity you afforded us in renewing old acquaintances while at the Foundry Convention and for the many kind words of praise expressed by you for our equipment, which is helping to do the work so vitally necessary in the production of good castings.

Our intentions are and always will be to help in overcoming the many arduous tasks and to make the foundry a better place in which to work. Our engineering services are at all times available.

Again we thank you.

Very truly yours,

MODERN EQUIPMENT COMPANY

BRANCH OFFICES IN THE FOLLOWING CITIES

Canadian Foundry Supply & Equipment Ltd.
4295 Richelieu Street,
Montreal, Quebec

Canadian Foundry Supply & Equipment Ltd.
317 Harbour Comm. Bldg.,
Toronto 2, Ontario

Chamberlain Company
4700 District Blvd.,
Los Angeles 11, Calif.

F. T. Crowe Corp.
218 Walker Bldg.,
Seattle, Washington

M. L. Doelman
66 Russell Avenue,
Buffalo 14, New York

W. W. Drissen
7328 Hamilton Blvd.,
Detroit 2, Michigan

W. C. Edgar
Oliver Bldg.,
Pittsburgh, Pa.

George C. Lever
50 Church St.,
New York, New York

Russell F. Lincoln
1058 Maplecliffe Drive,
Lakewood, Ohio

R. Elliott Maxwell
136 Liberty Street,
New York, New York

Mayer & Oswald, Inc.
37 West Van Buren,
Chicago 5, Ill.

McArlde Equipment Co.
5724 Navagation Blvd.,
Houston, Texas

McVoy Hasman Co.
2024 6th Ave. N.,
Birmingham, Ala.

Minneapolis Supply Co.
706 Sixth Ave., S.
Minneapolis, Minn.

Robbins Equipment Co.
535 Chattanooga Bank,
Chattanooga 2, Tenn.

Shea-Brownell Co.
3908 Olive Street,
Wall Bldg., Room 1 and 2,
Suite 316, St. Louis, Mo.

S. R. Vanderbeck
731 Commercial Trust,
Philadelphia 2, Pa.

Whitehead Bros. Co.
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Cupolas • Cupola Chargers • Lifetime Geared Ladles • Ladles • Electric Cranes
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Stevens Liquid Parting

IS SELLING TO BEAT THE BAND

IT'S THE LEADER

FREDERIC B. STEVENS INCORPORATED
EVERYTHING FOR A FOUNDRY
DETROIT 26 MICHIGAN

THE REASONS FOR ITS LEADERSHIP

1. The most economical type of parting. Since from 20 to 60 molds are obtained from one application, the time consumed in shaking dry parting from cloth bags for each mold is eliminated.
2. Parts molding sand cleanly from metal pattern plates no matter how difficult the draw.
3. No dust in the air around the molder.
4. Used in core boxes, cores come out clean and smooth.
5. Molders like to rub a little on their shovels to keep the molding sand from sticking.
6. An ideal rust preventive for stored core boxes and metal pattern plates.

Write for working sample and instruction on how to use.

FREDERIC B. STEVENS INCORPORATED

DETROIT 26 MICHIGAN

- NEW ENGLAND . 166-182 Brewery St., New Haven, Conn.
- NEW YORK and PENNSYLVANIA, 93 Stone St., Buffalo, N. Y.
- INDIANA . Hoosier Supply Co., 36 Shelby St., Indianapolis, Ind.
- CANADA . FREDERIC B. STEVENS OF CANADA, LIMITED
- 1262 McDougall St. . . . . Windsor, Ontario
- 2368 Dundas St., West . . . . . Toronto, Ontario

...memo to LINK-BELT

What we need is some sort of arrangement that will do a better job of handling ingots. This installation should:

1. Spot trays in front of the discharge spout.
2. Move the trays to the discharge point without the hot job of pushing them.
3. Control tray movement without agitating metal. Ingots with ripples do not command the price of smooth ingots.
4. Increase production.

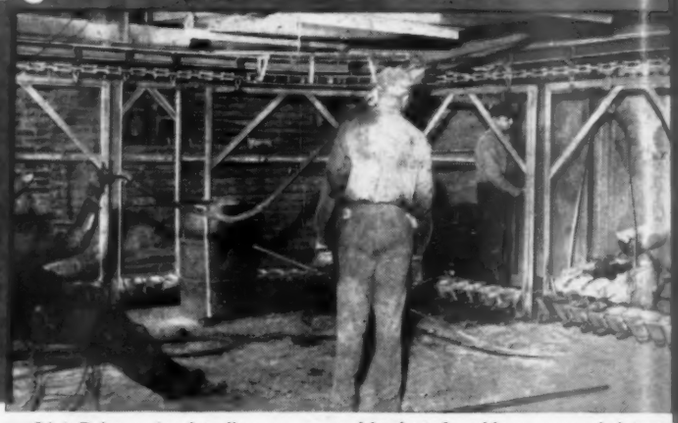
SILVERSTEIN AND PINSOF INCORPORATED

SIPI

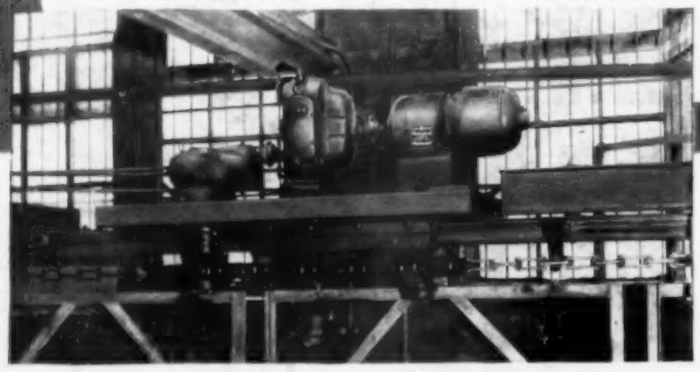
BRASS • BRONZE • ALUMINUM

PHONE ARMITAGE 0070 · 1720 ELSTON AVENUE · CHICAGO

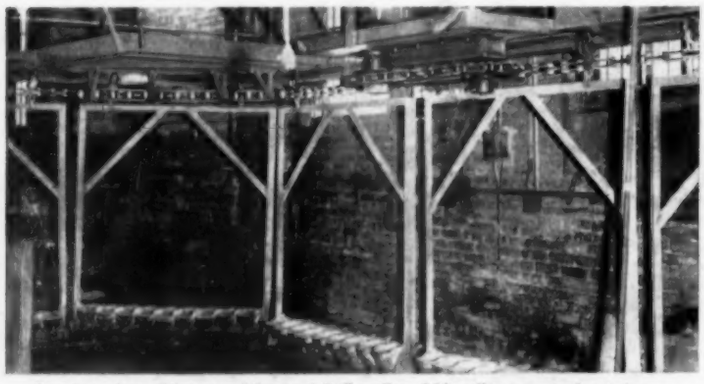
LINK-BELT conveyor meets all 4 requirements



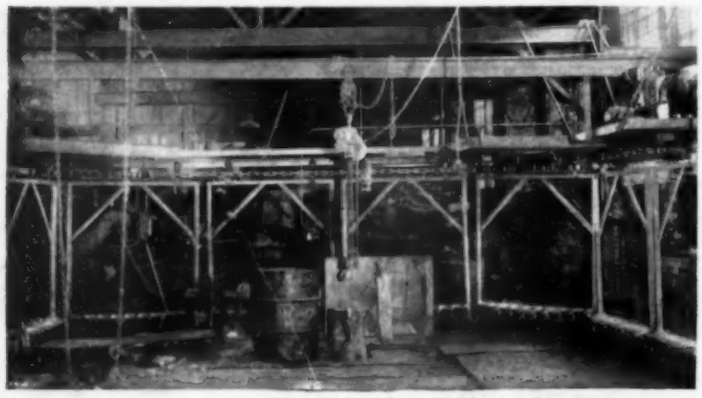
Link-Belt overhead trolley conveyor with pivoted molds on suspended trays, *each tray* carrying 9 molds. Man in chair operates pouring ladle with push button control to start and stop conveyor.



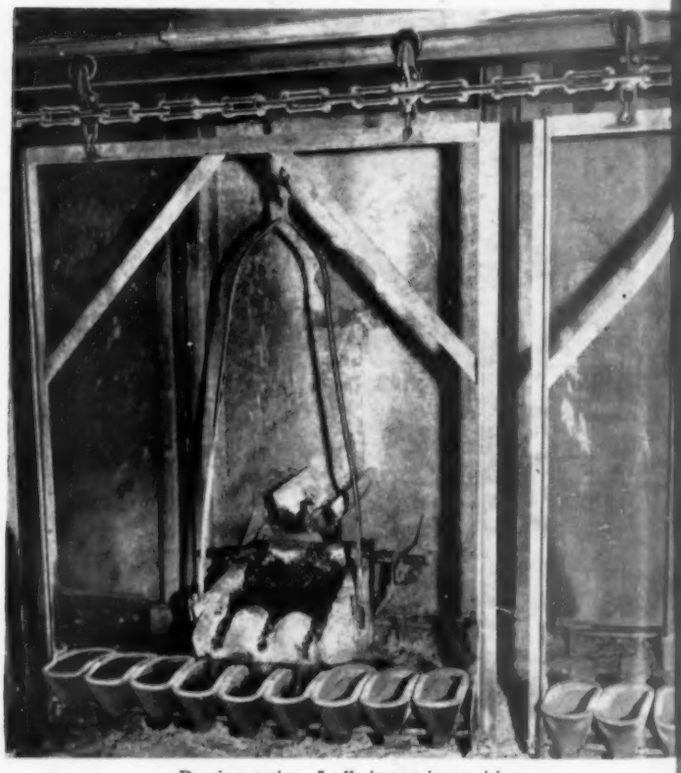
Overhead trolley conveyor booster drive with speed reducer, P.I.V. gear speed changer, permitting speed variation of from 12 to 48 FPM., 6 to 8 starts per minute.



Another view of booster drive and 72" radius, 90° roller turn spring take-up.



Discharge station. Molds are dumped into pit behind metal shield.



Pouring station. Ladle in pouring position.

...memo to you

Increase your output, cut costs, decrease employee turnover by mechanizing the handling problems of your foundry. Link-Belt experienced foundry engineers are prepared to help you analyze your operations and suggest mechanization for sand preparation and sand, mold, core and casting handling units.

10,328

LINK-BELT COMPANY

Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Dallas 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8. Offices in Principal Cities.

THE SYMBOL OF QUALITY · LINK-BELT · LB

MANUFACTURERS ASSOCIATION, INC. FOUNDRY EQUIPMENT

LINK-BELT CONVEYORS

AND PREPARATION MACHINERY

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with push

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